

FIG. 1

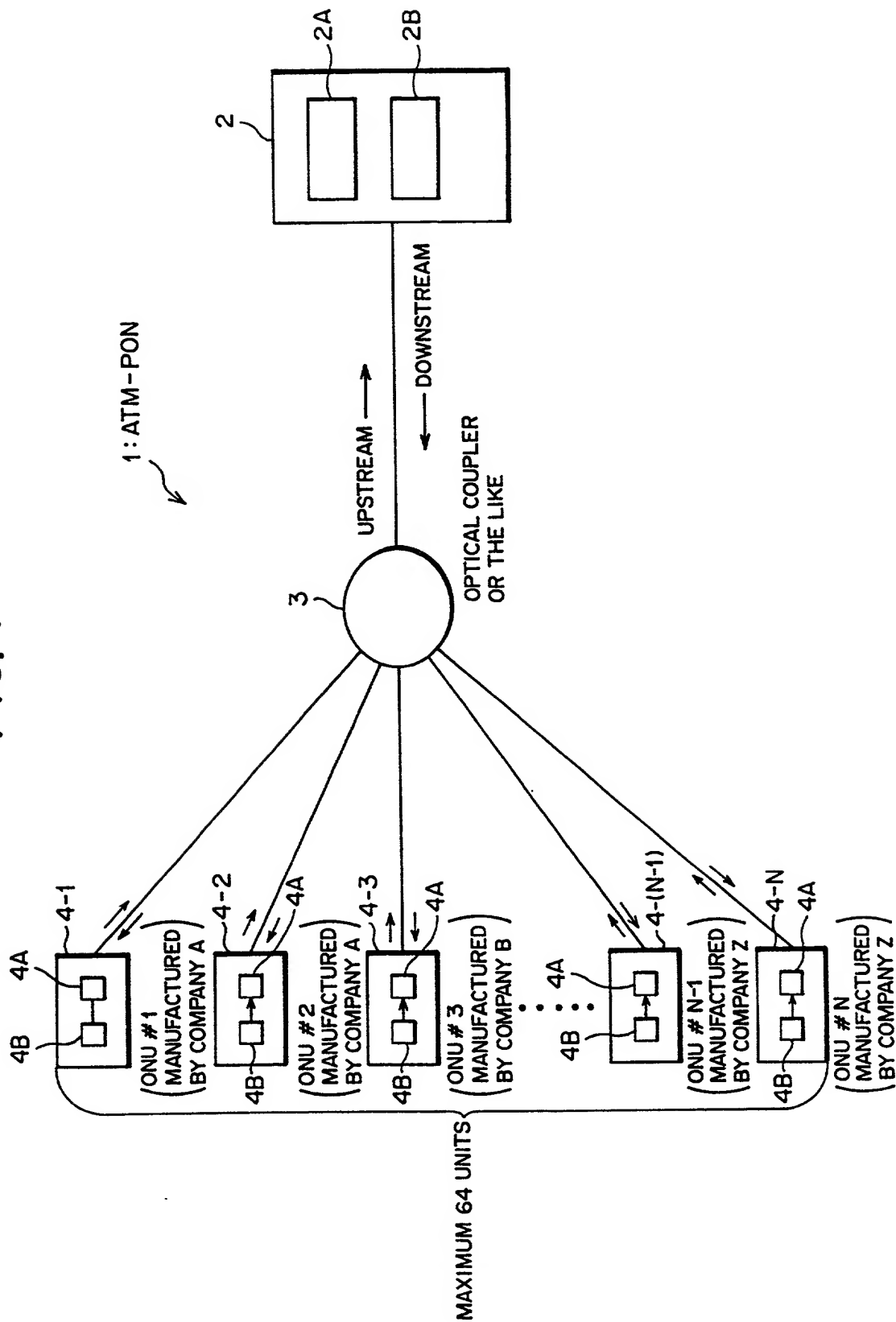


FIG. 2

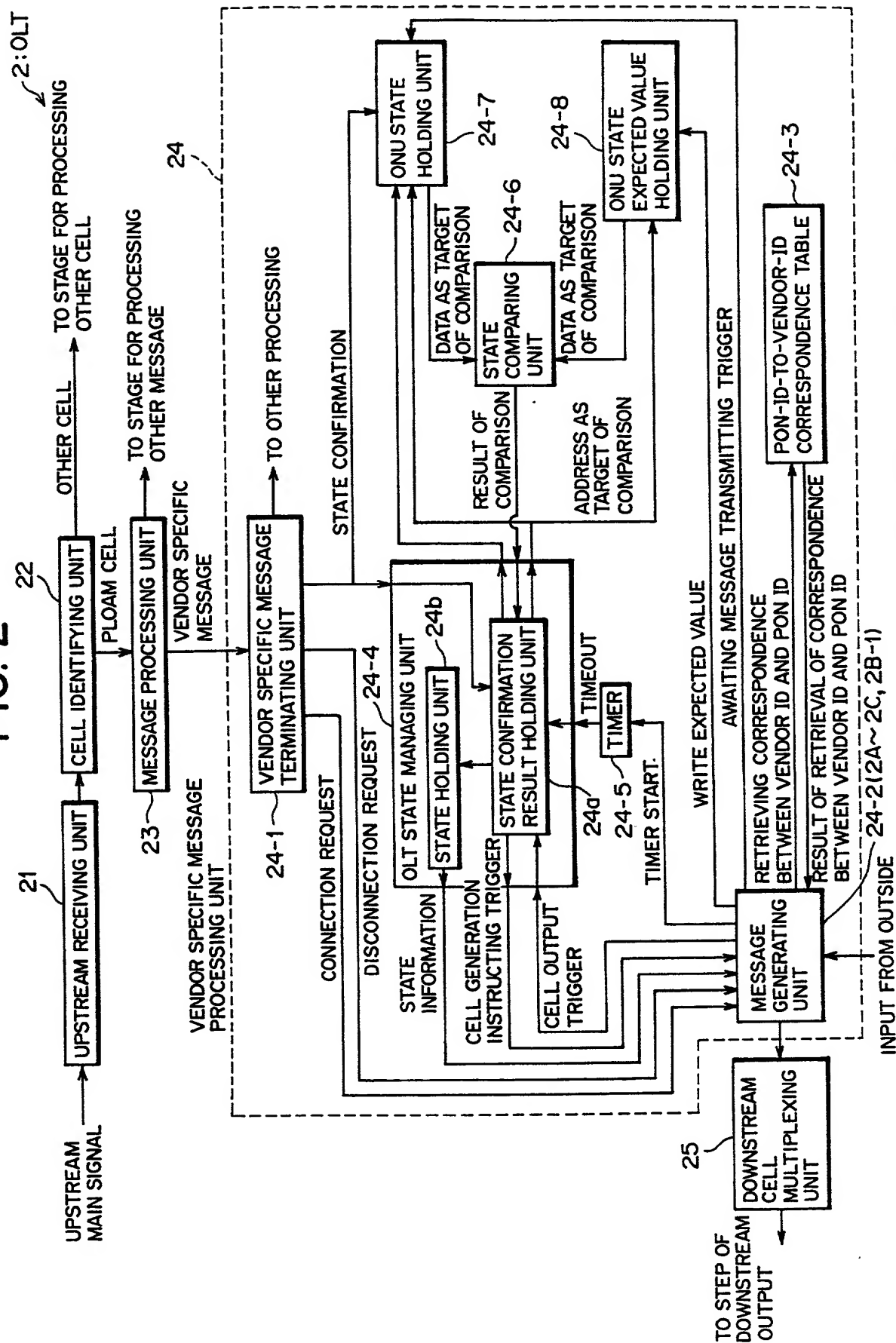


FIG. 3

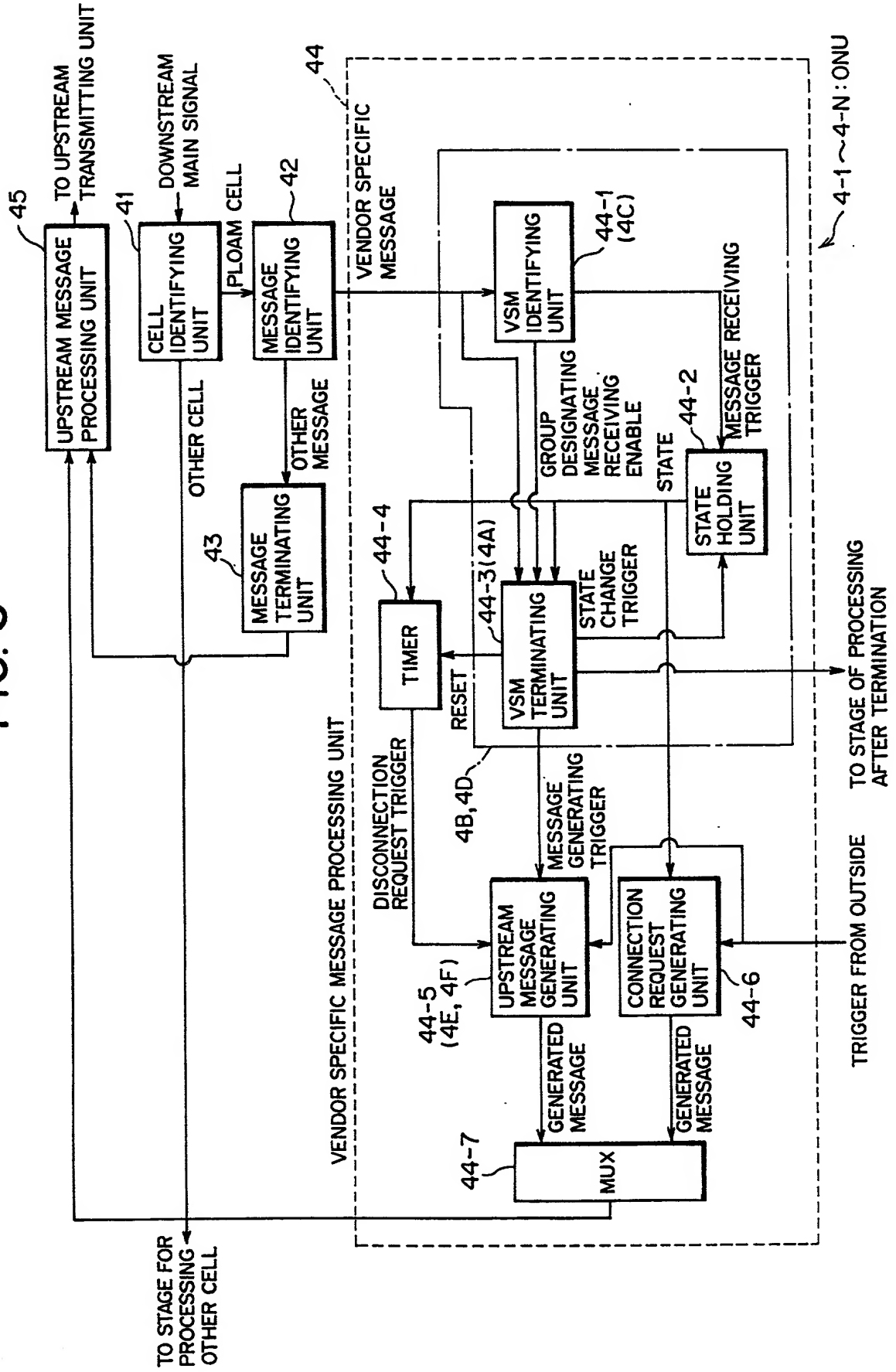


FIG. 4

PLOAM CELL HEADOR

	Octet1	Octet2	Octet3	Octet4	Octet5
(PHYSICAL LAYER) OAM CELL FOR USE IN ATM-POM	00000000	00000000	00000000	0001101	HEC=VARID CODE 01110110

FIG. 5A

BYTE	CONTENTS	
40	xxxxxxx	INDIVIDUAL PON ID OR BROADCAST TYPE PON ID = 0x40 ← 113
41	01111zzz	COMMON MESSAGE ID, E.G., 0x78 ← 112
42	0000000g	LSB IS UTILIZED AS A GROUPING FLAG ← 114
43	Vendor ID1	VENDOR ID OF ONU ← 115
44	Vendor ID2	VENDOR ID OF ONU
45	Vendor ID3	VENDOR ID OF ONU
46	Vendor ID4	VENDOR ID OF ONU
47	Unspecified	DON'T CARE
48	Unspecified	DON'T CARE
49	Unspecified	DON'T CARE
50	Unspecified	DON'T CARE
51	Unspecified	DON'T CARE

FIG. 5B

	MODE INTO WHICH CURRENT STATE IS CHANGED
0	CHANGE INTO AWAITING MODE
1	CHANGE INTO RECEIVING ALLOWABLE MODE

FIG. 6

REPLY MESSAGE

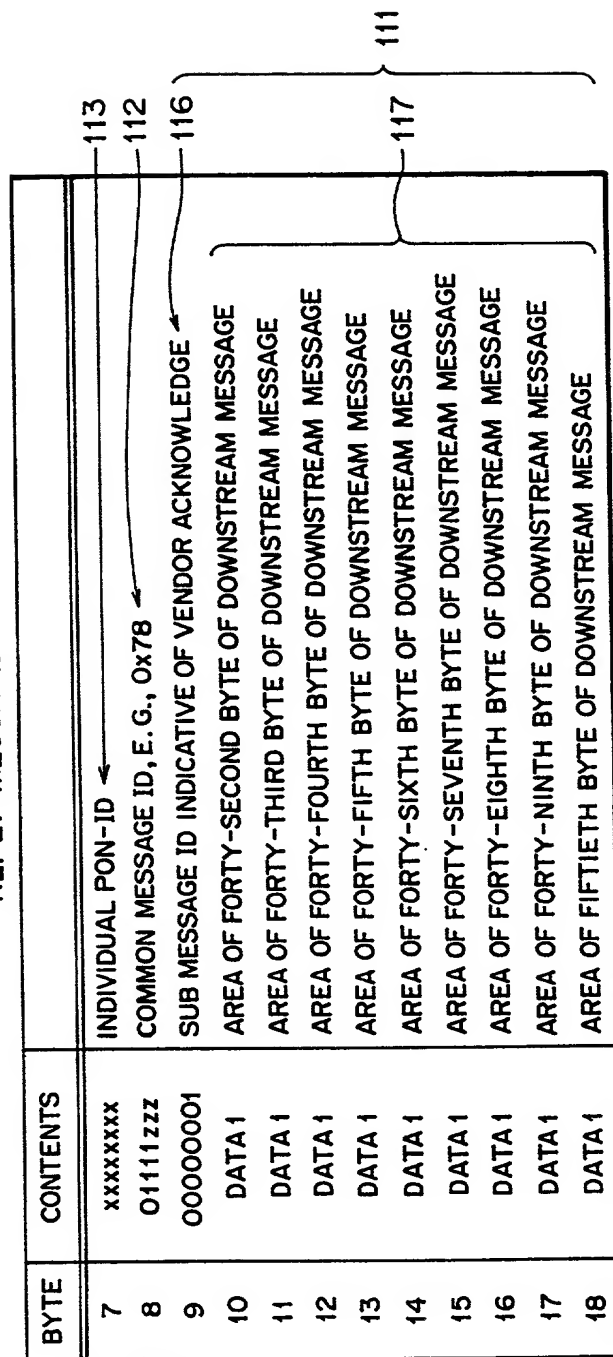


FIG. 7

DISCONNECT REQUEST MESSAGE

BYTE	CONTENTS	
7	xxxxxxx	INDIVIDUAL PON-ID ← 113
8	01111zzz	COMMON MESSAGE ID, E.G., 0x78 ← 112
9	00000010	SUB MESSAGE ID INDICATIVE OF DISCONNECT ← 116
10	Unspecified	DON'T CARE
11	Unspecified	DON'T CARE
12	Unspecified	DON'T CARE
13	Unspecified	DON'T CARE
14	Unspecified	DON'T CARE
15	Unspecified	DON'T CARE
16	Unspecified	DON'T CARE
17	Unspecified	DON'T CARE
18	Unspecified	DON'T CARE

111

FIG. 8A

CONNECTION REQUEST MESSAGE

BYTE	CONTENTS	
7	xxxxxxx	INDIVIDUAL PON-ID ← 113
8	01111zzz	COMMON MESSAGE ID, E.G., 0x78 ← 112
9	00000011	SUB MESSAGE ID INDICATIVE OF REQUEST ← 116
10	0000000p	p REPRESENTS ALL UNITS CONSTITUTING GROUP OR INDIVIDUAL UNIT ← 118
11	Unspecified	DON'T CARE
12	Unspecified	DON'T CARE
13	Unspecified	DON'T CARE
14	Unspecified	DON'T CARE
15	Unspecified	DON'T CARE
16	Unspecified	DON'T CARE
17	Unspecified	DON'T CARE
18	Unspecified	DON'T CARE

FIG. 8B

P	CONTENTS
0	REQUEST OF CONNECTION TO ALL UNITS CONSTITUTING VENDOR GROUP
1	REQUEST OF CONNECTION TO INDIVIDUAL UNIT

FIG. 9

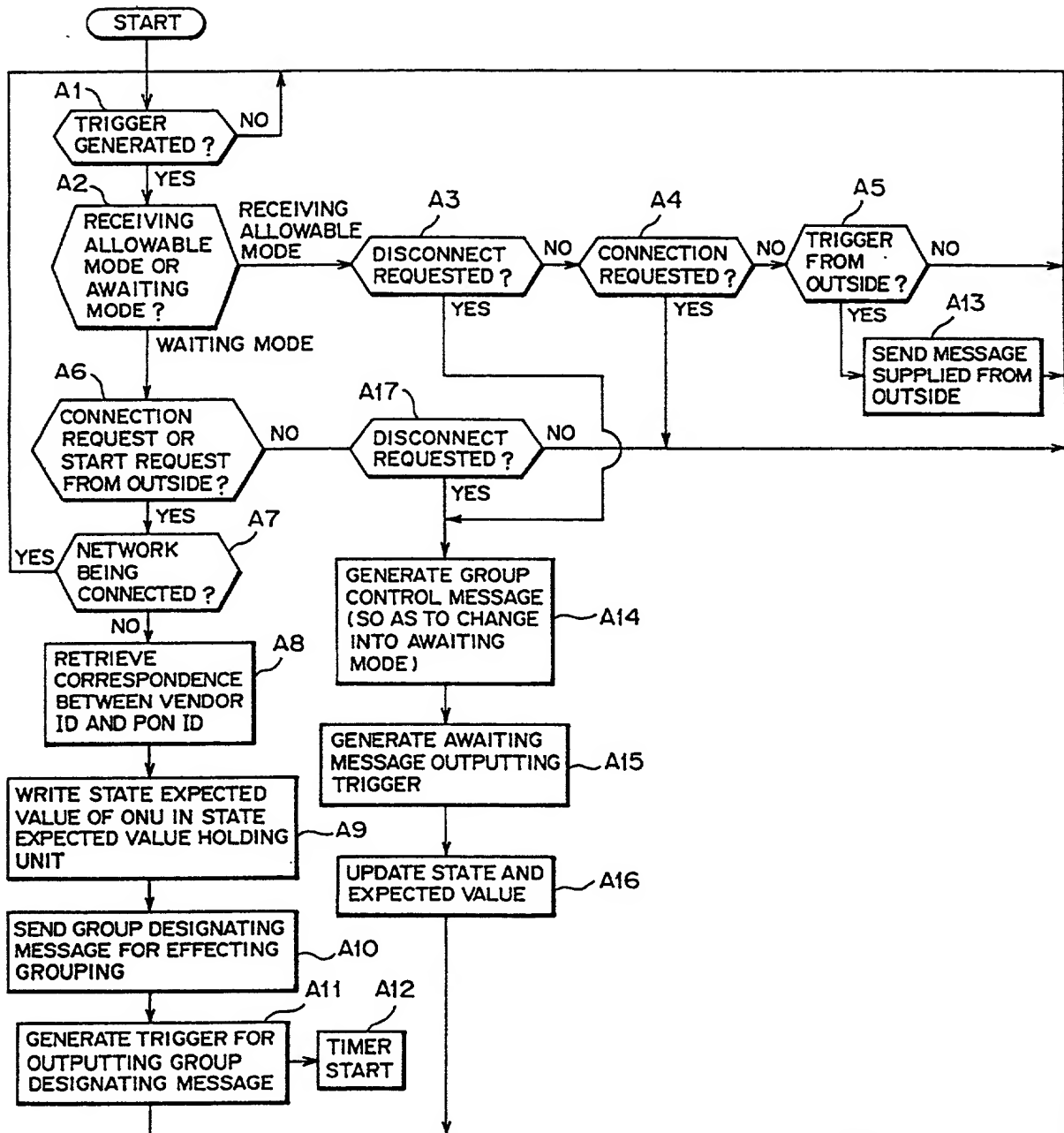


FIG. 10

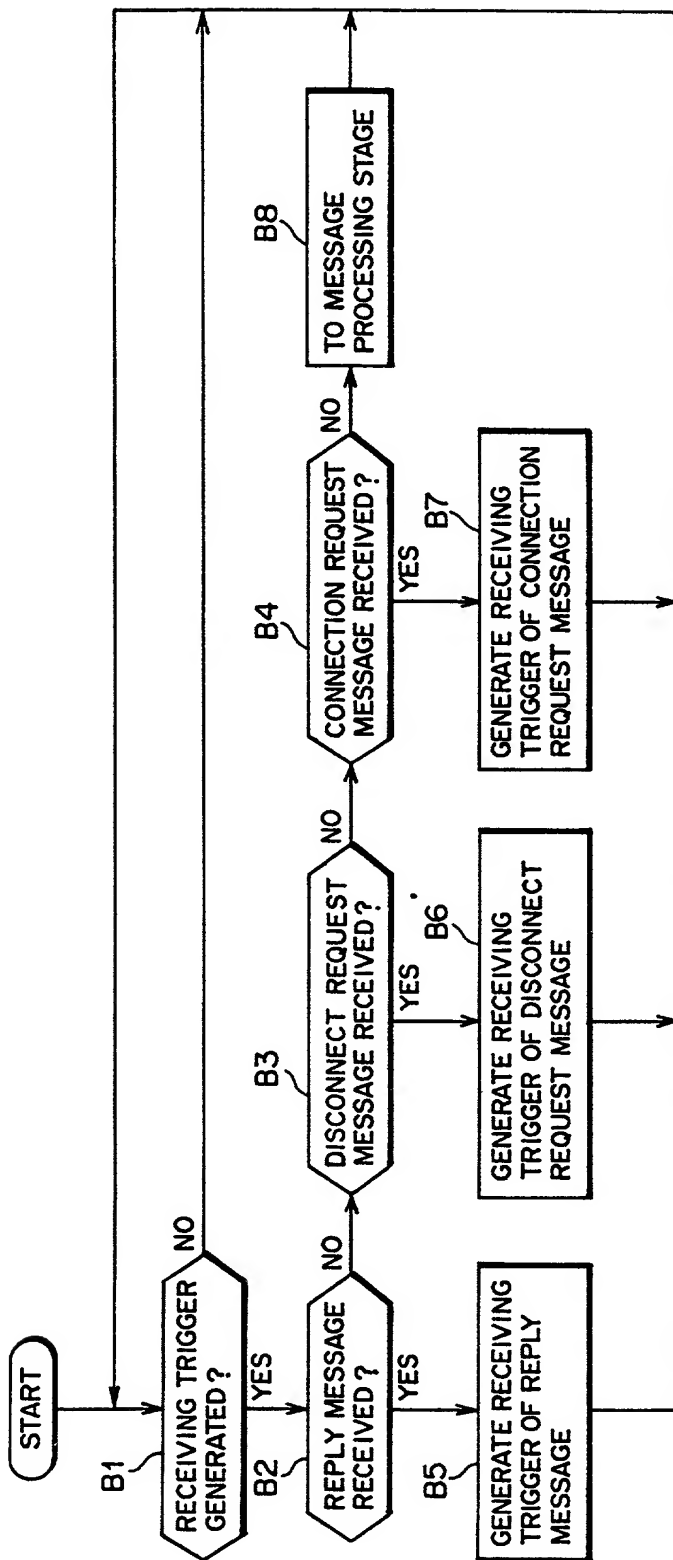


FIG. 11

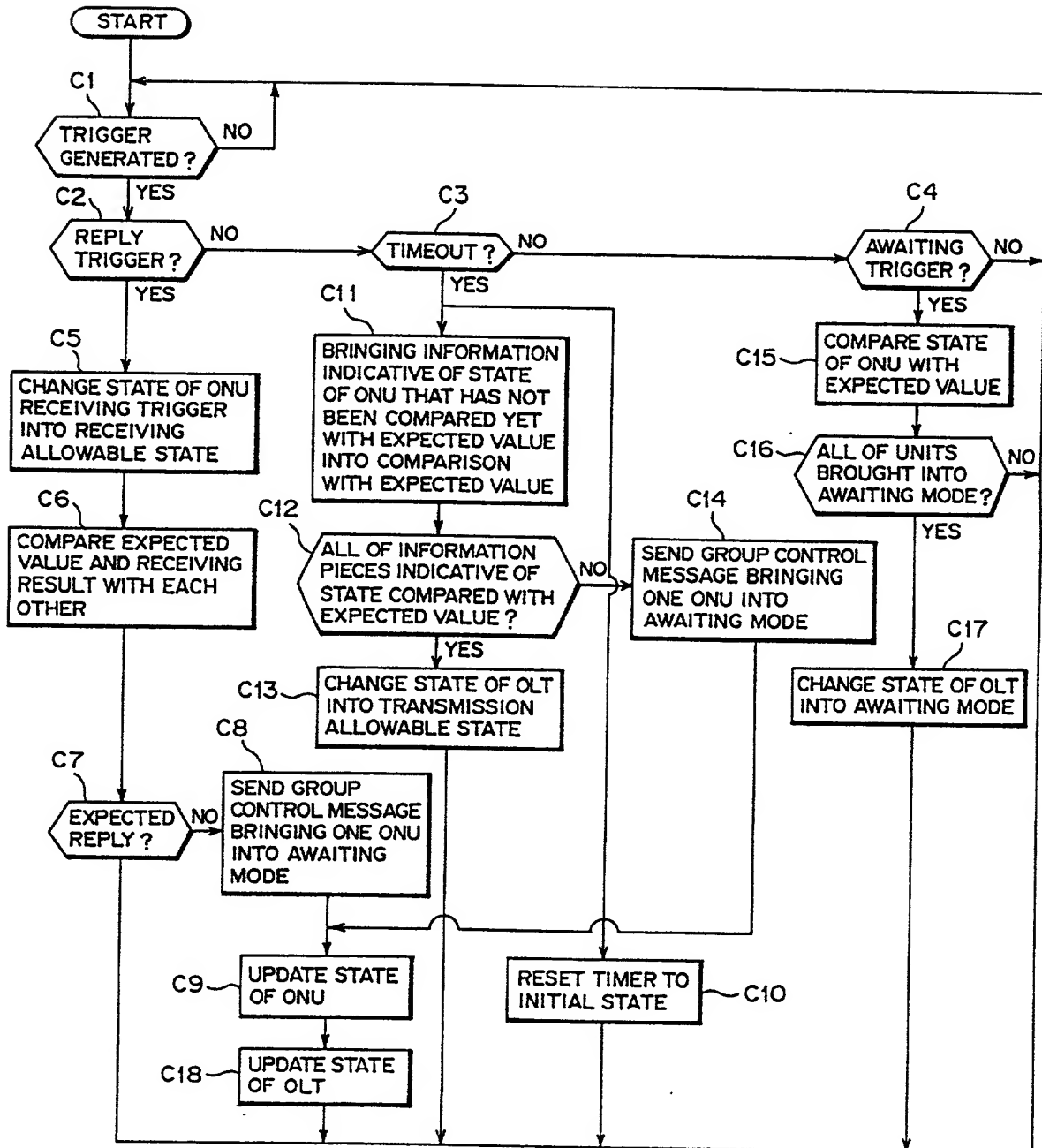


FIG. 12

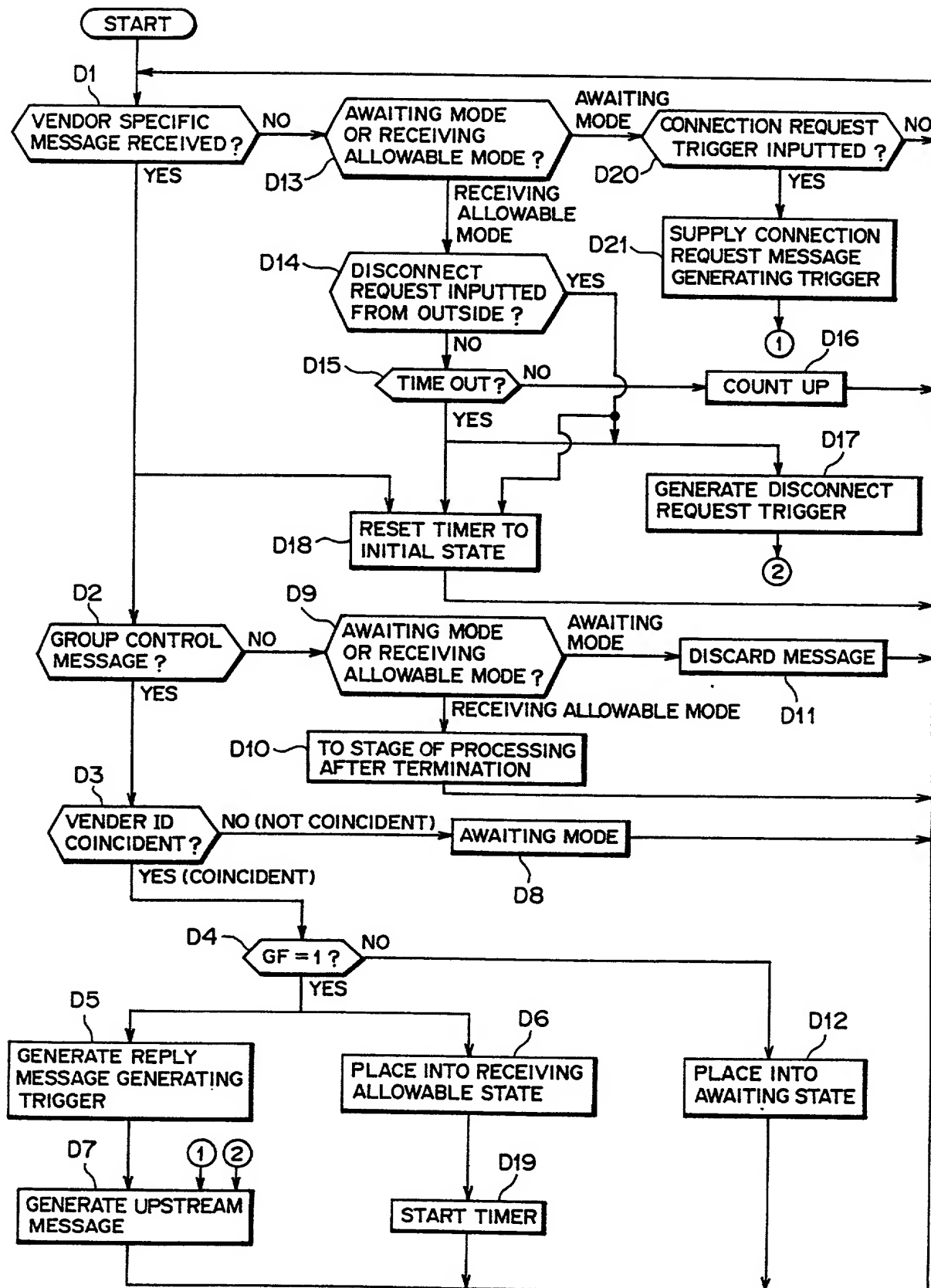


FIG. 13

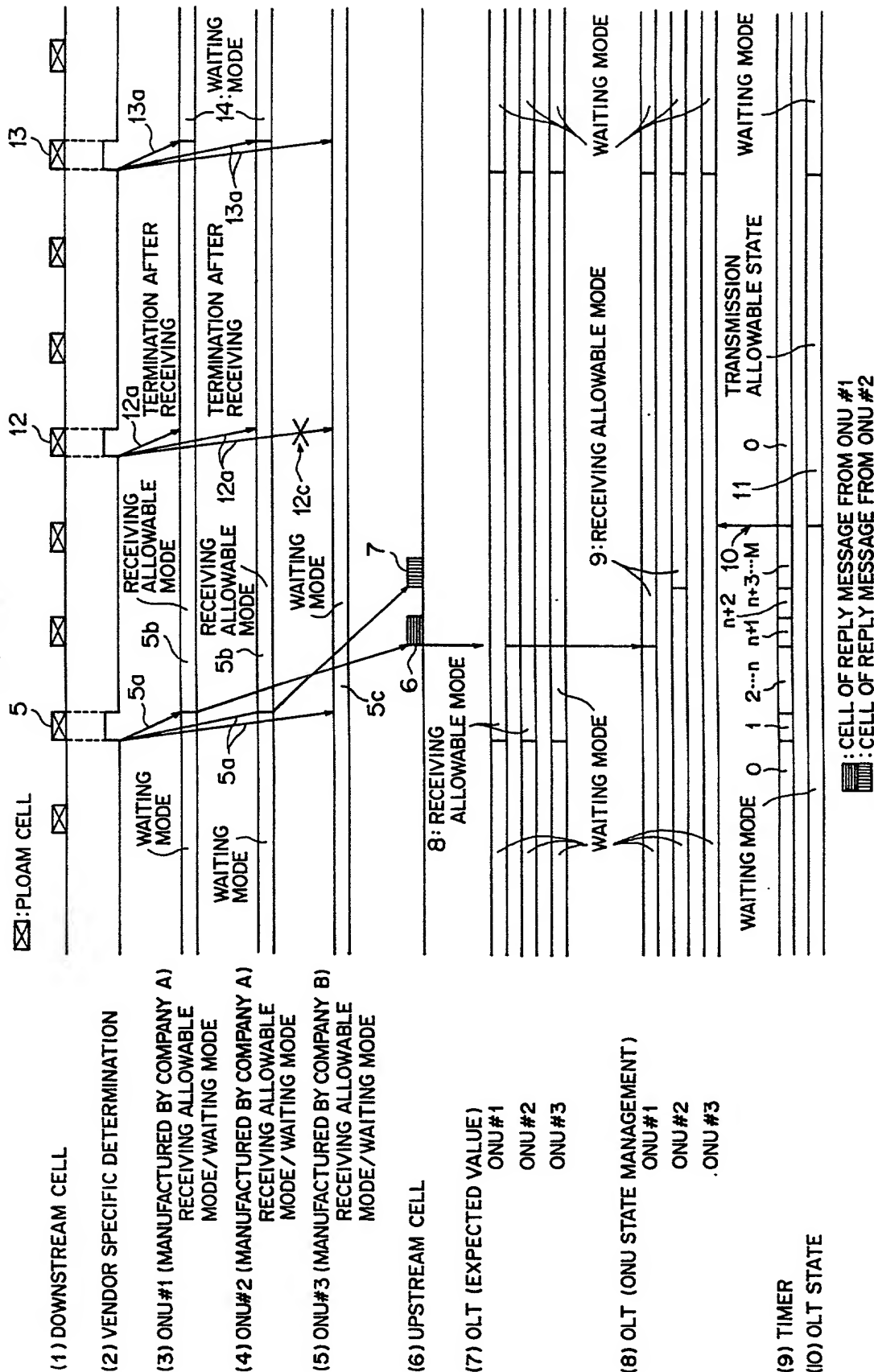
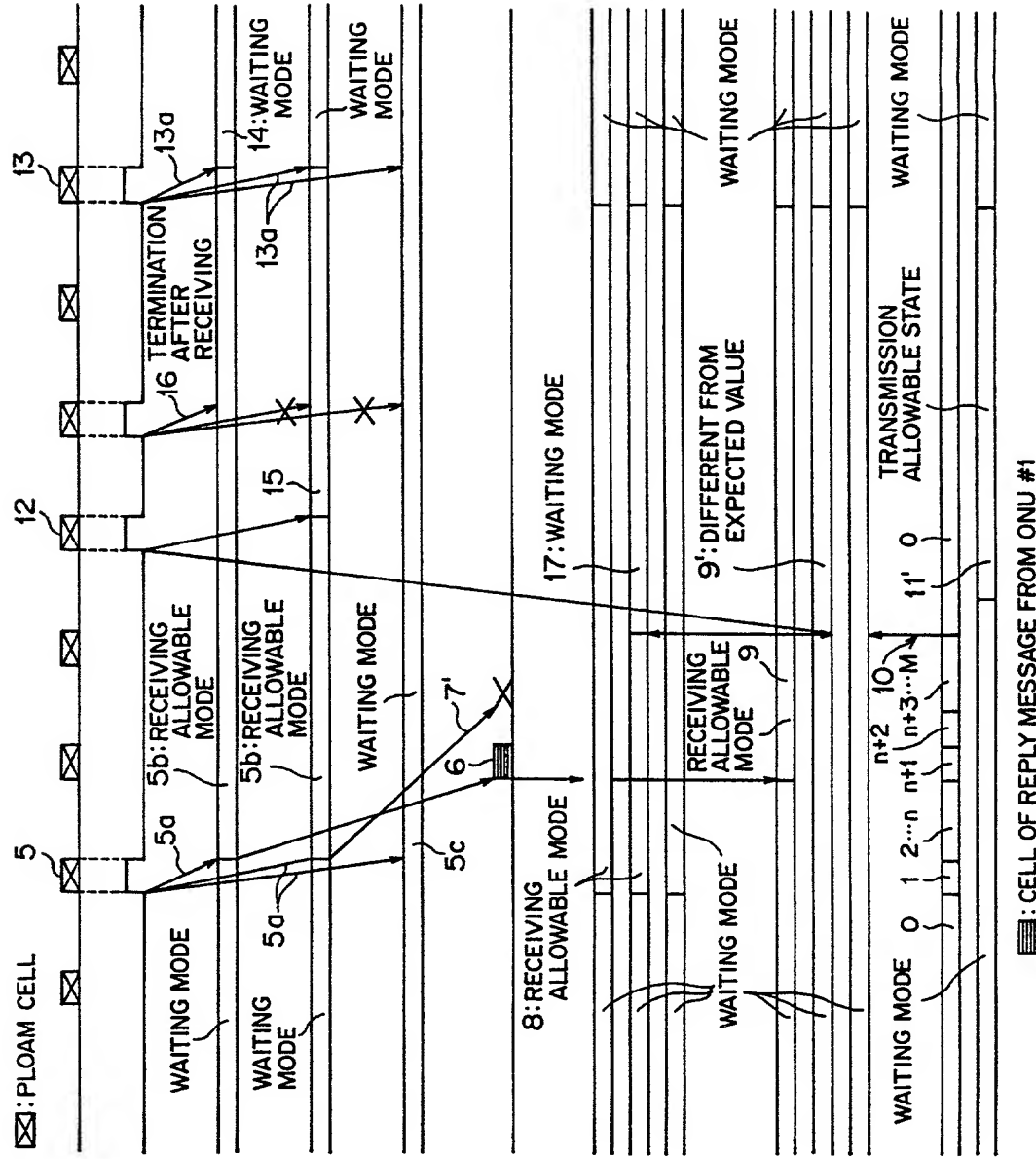


FIG. 14



(1) DOWNSTREAM CELL

(2) VENDOR SPECIFIC DETERMINATION

(3) ONU #1 (MANUFACTURED BY COMPANY A)
RECEIVING ALLOWABLE
MODE / WAITING MODE

(4) ONU #2 (MANUFACTURED BY COMPANY A)
RECEIVING ALLOWABLE
MODE / WAITING MODE

(5) ONU #3 (MANUFACTURED BY COMPANY B)
RECEIVING ALLOWABLE
MODE / WAITING MODE

(6) UPSTREAM CELL

(7) OLT (EXPECTED VALUE)
ONU #1
ONU #2
ONU #3

(8) OLT (ONU STATE MANAGEMENT)
ONU #1
ONU #2
ONU #3

(9) TIMER

(10) OLT STATE

■: CELL OF REPLY MESSAGE FROM ONU #1

FIG. 15

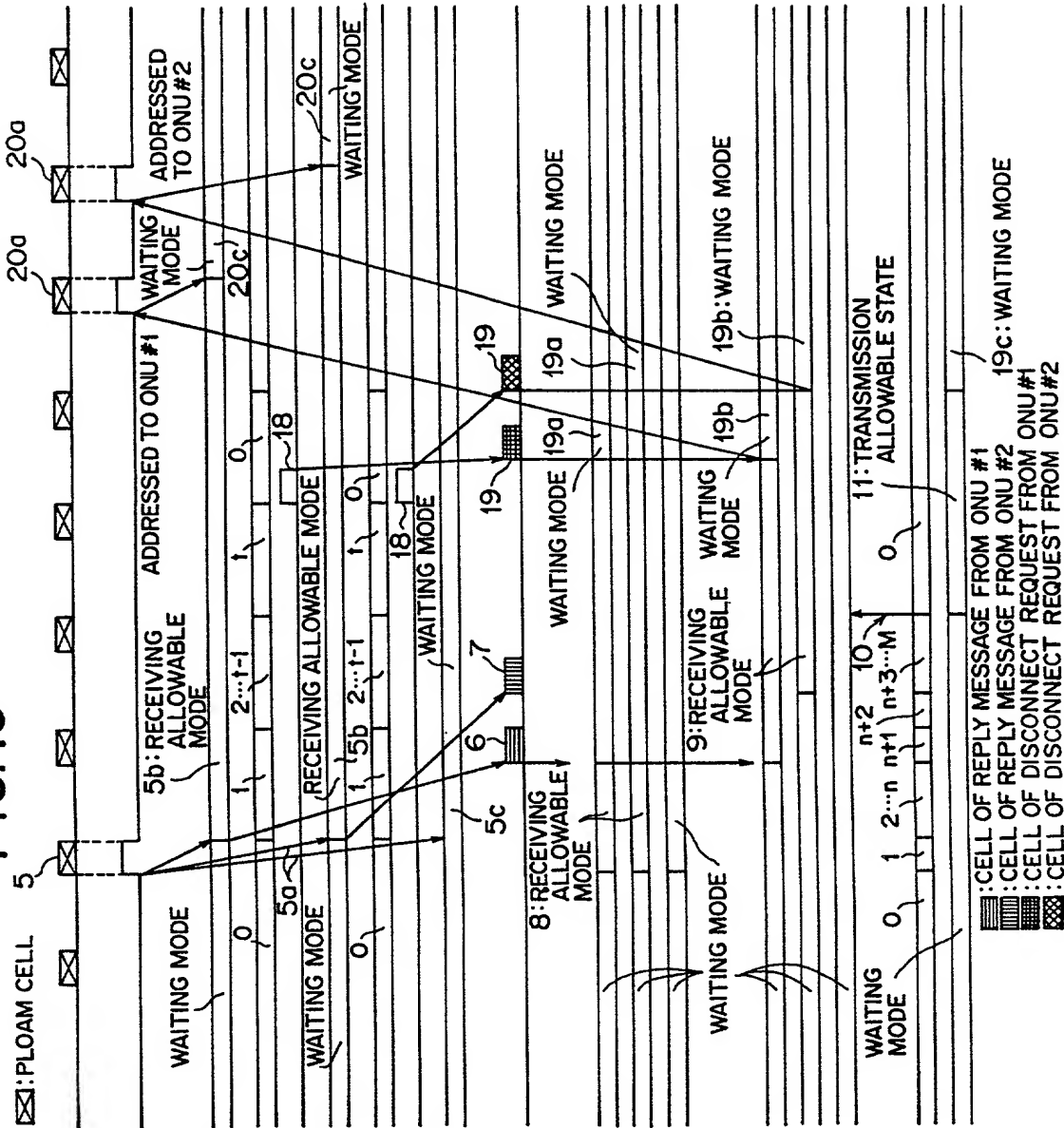


FIG. 16

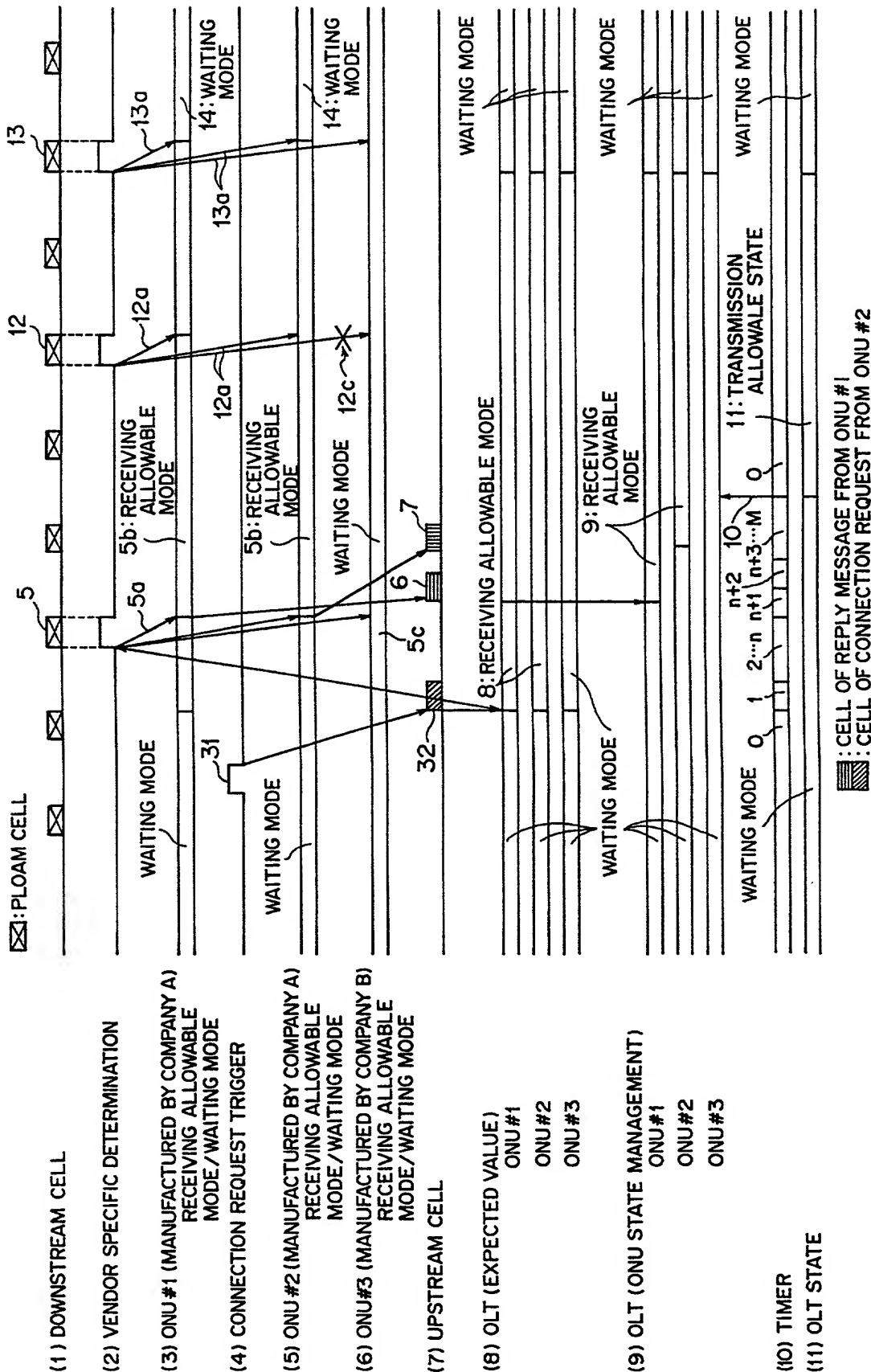


FIG. 17

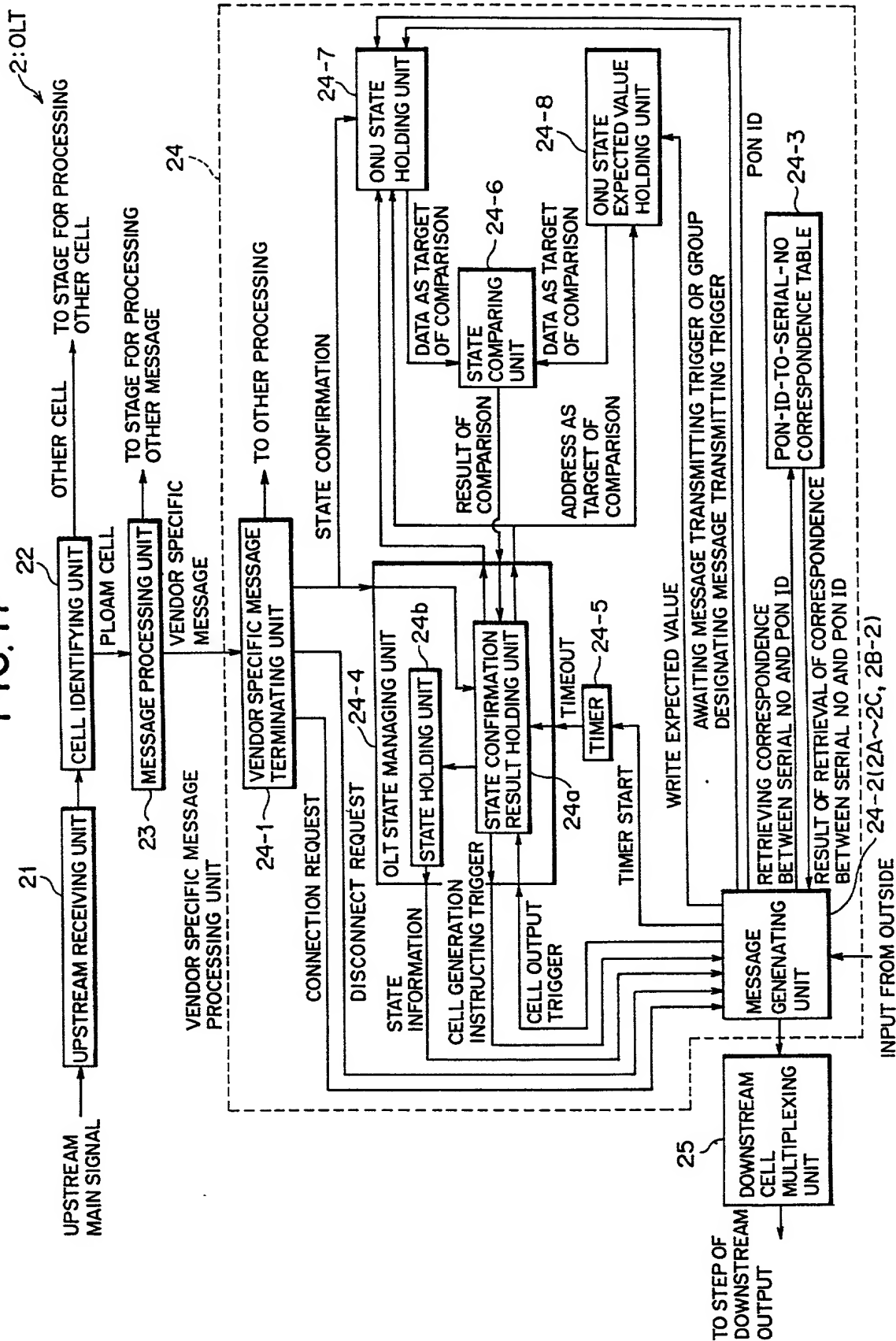


FIG. 18A

BYTE	CONTENTS	
40	xxxxxxx	INDIVIDUAL PON-ID OR BROADCAST TYPE PON ID=0x40
41	01111zz	COMMON MESSAGE ID, E.G., 0x78
42	0000001g	LSB IS UTILIZED AS A GROUPING FLAG
43	Serial No1-1	SERIAL NO.(1) INHERENT IN VENDOR OF ONU
44	Serial No1-2	SERIAL NO.(1) INHERENT IN VENDOR OF ONU
45	Serial No1-3	SERIAL NO.(1) INHERENT IN VENDOR OF ONU
46	Serial No1-4	SERIAL NO. (1) INHERENT IN VENDOR OF ONU
47	Serial No2-1	SERIAL NO. (2) INHERENT IN VENDOR OF ONU
48	Serial No2-2	SERIAL NO. (2) INHERENT IN VENDOR OF ONU
49	Serial No2-3	SERIAL NO. (2) INHERENT IN VENDOR OF ONU
50	Serial No2-4	SERIAL NO. (2) INHERENT IN VENDOR OF ONU
51	Unspecified	DON'T CARE

FIG. 18B

g	MODE INTO WHICH CURRENT STATE IS CHANGED
0	CHANGE INTO AWAITING MODE
1	CHANGE INTO RECEIVING ALLOWABLE MODE

FIG. 19

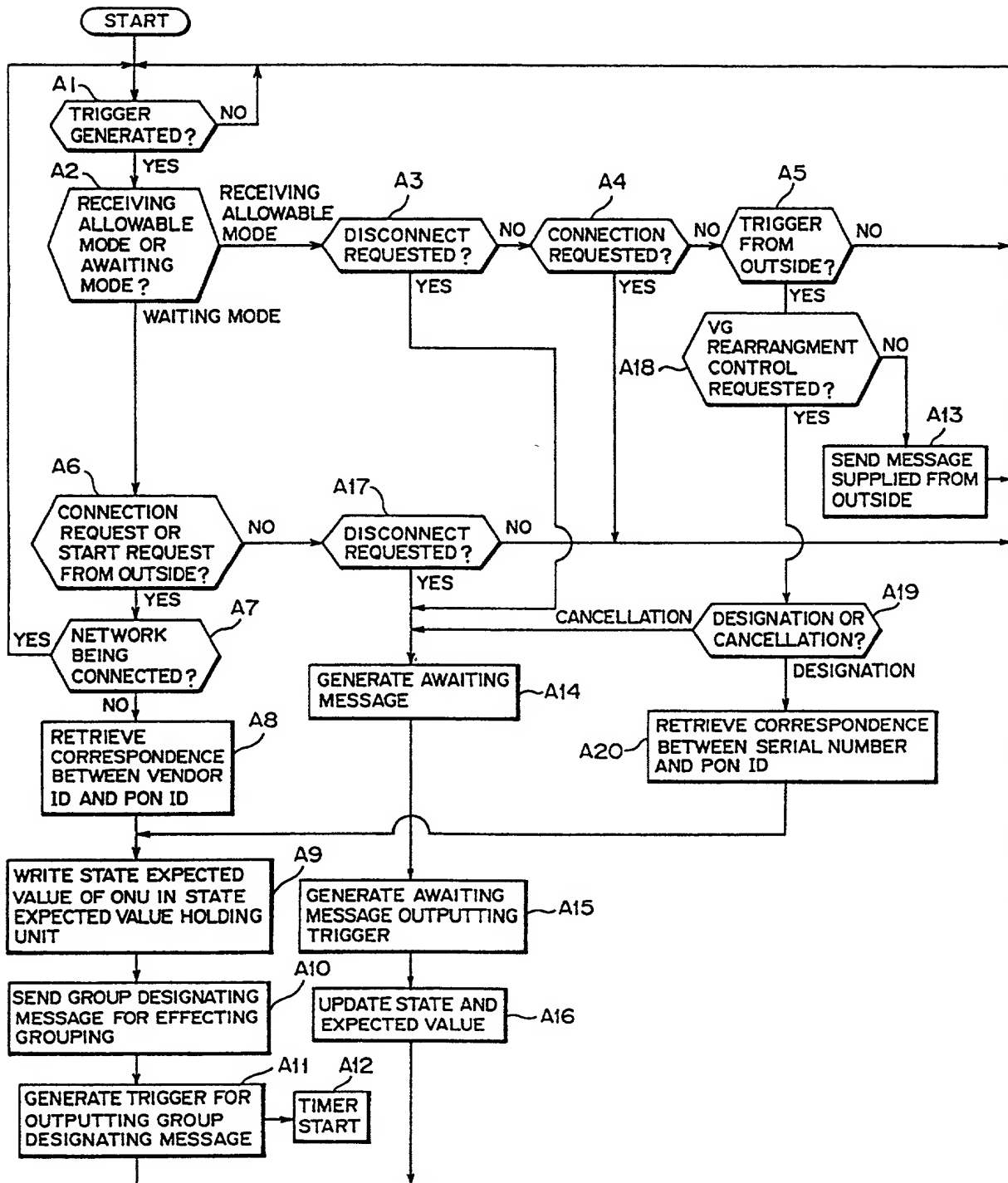


FIG. 20

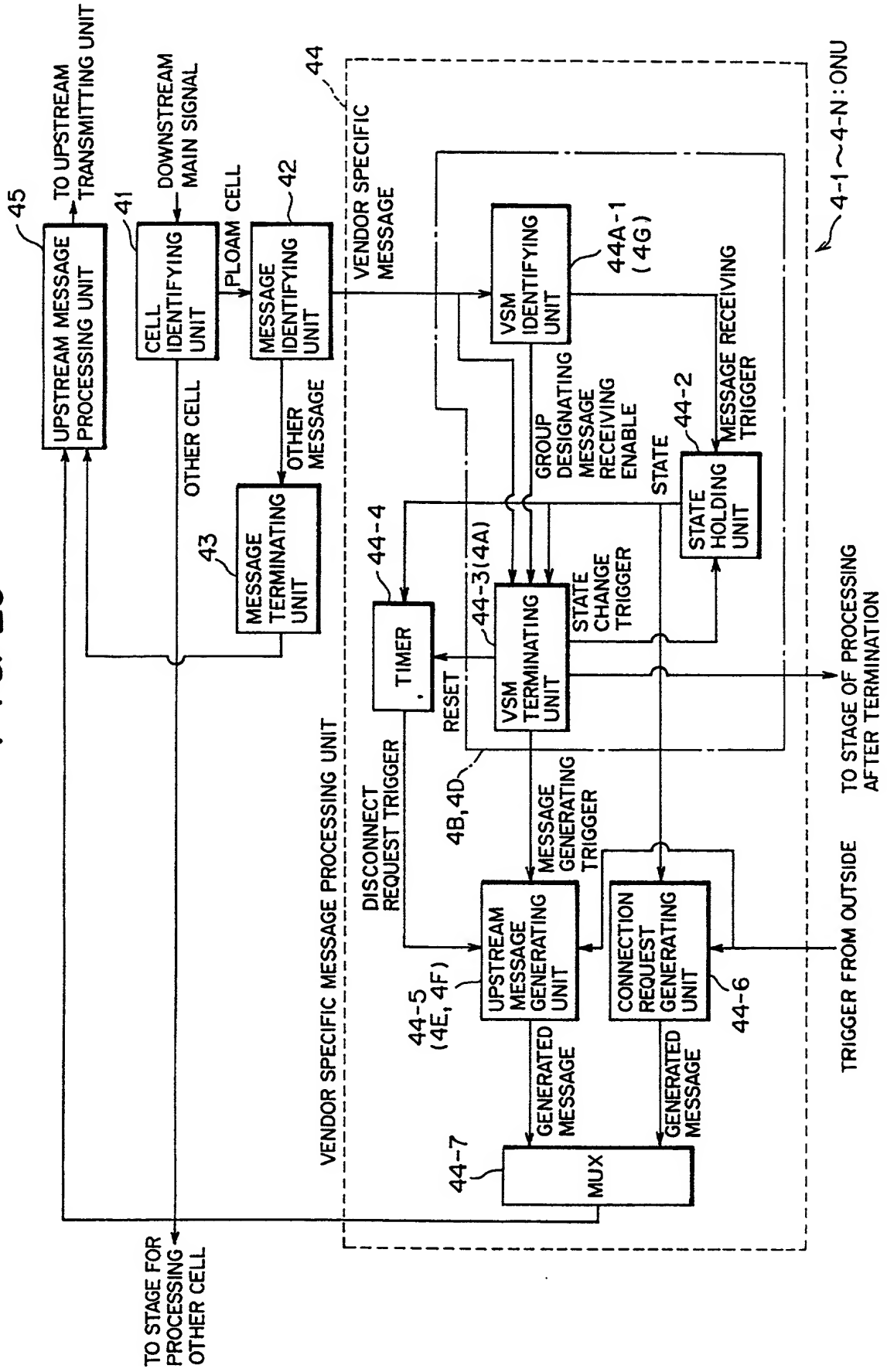


FIG. 21

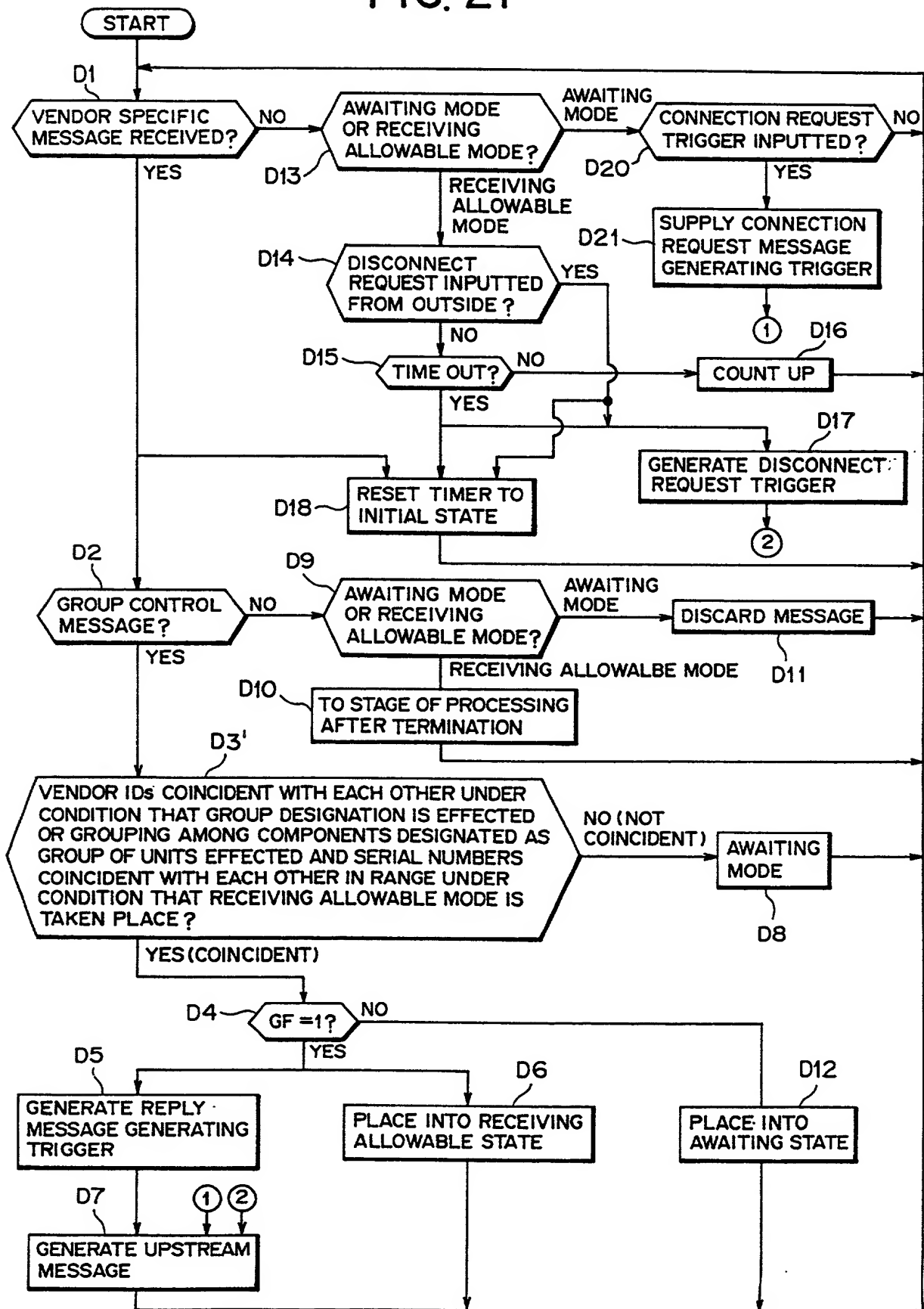
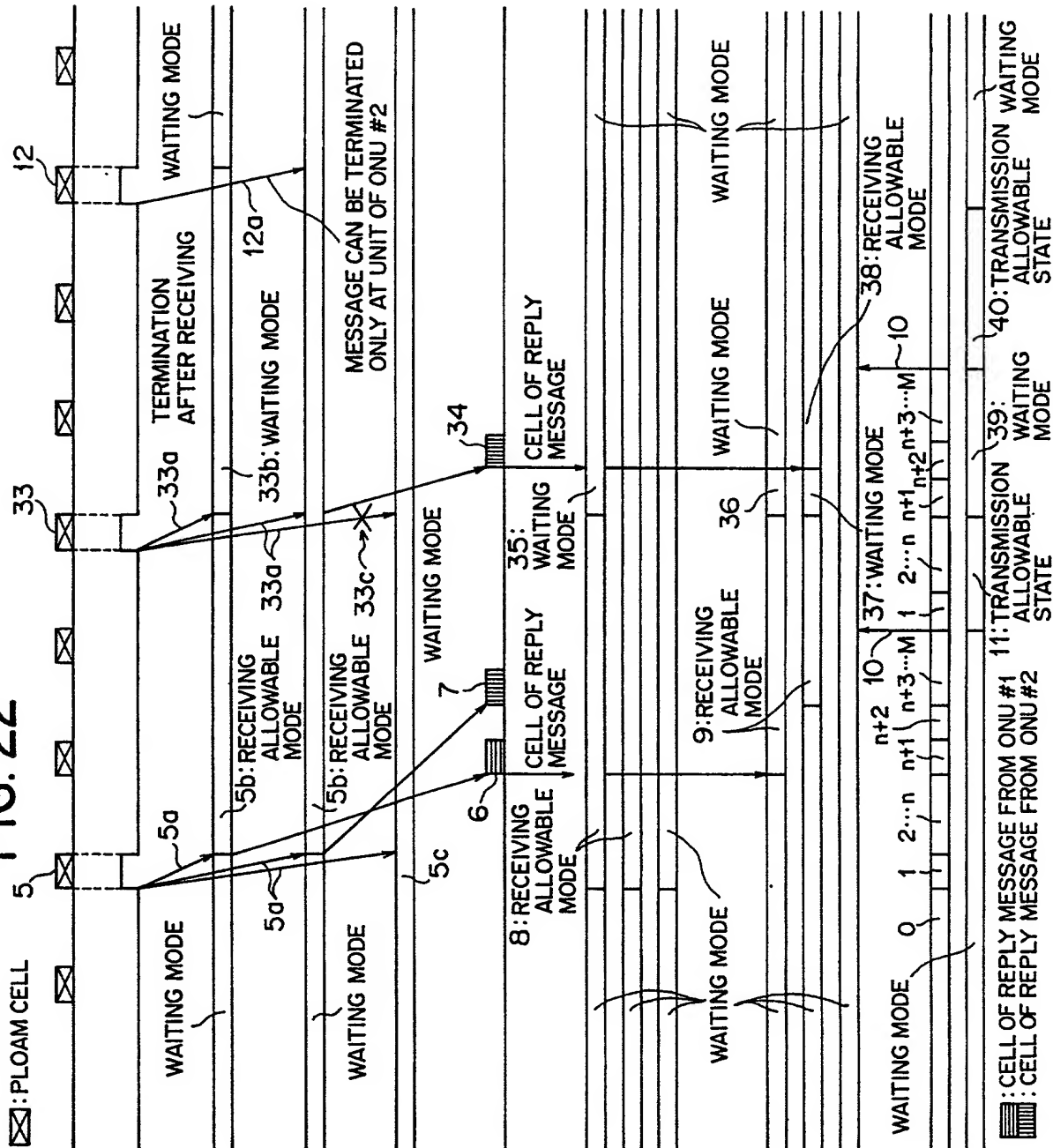


FIG. 22



- (1) DOWNSTREAM CELL
- (2) VENDOR SPECIFIC DETERMINATION
- (3) ONU #1 (MANUFACTURED BY COMPANY A)
RECEIVING ALLOWABLE MODE/WAITING MODE
- (4) ONU #2 (MANUFACTURED BY COMPANY A)
RECEIVING ALLOWABLE MODE/WAITING MODE
- (5) ONU #3 (MANUFACTURED BY COMPANY B)
RECEIVING ALLOWABLE MODE/WAITING MODE
- (6) UPSTREAM CELL
- (7) OLT (EXPECTED VALUE)
ONU #1
ONU #2
ONU #3
- (8) OLT (ONU STATE MANAGEMENT)
ONU #1
ONU #2
ONU #3
- (9) TIMER
- (10) OLT STATE

FIG. 23

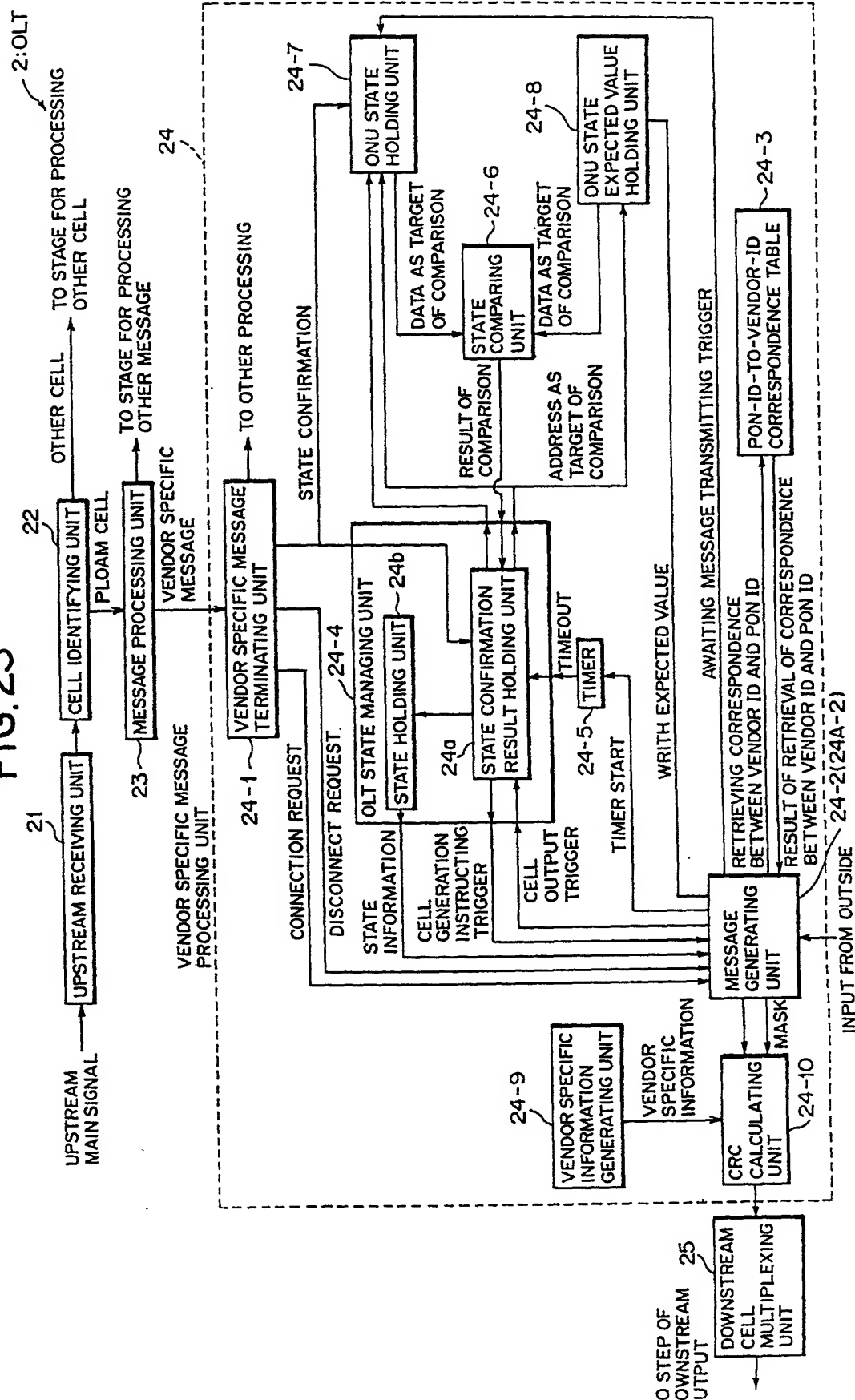


FIG. 24

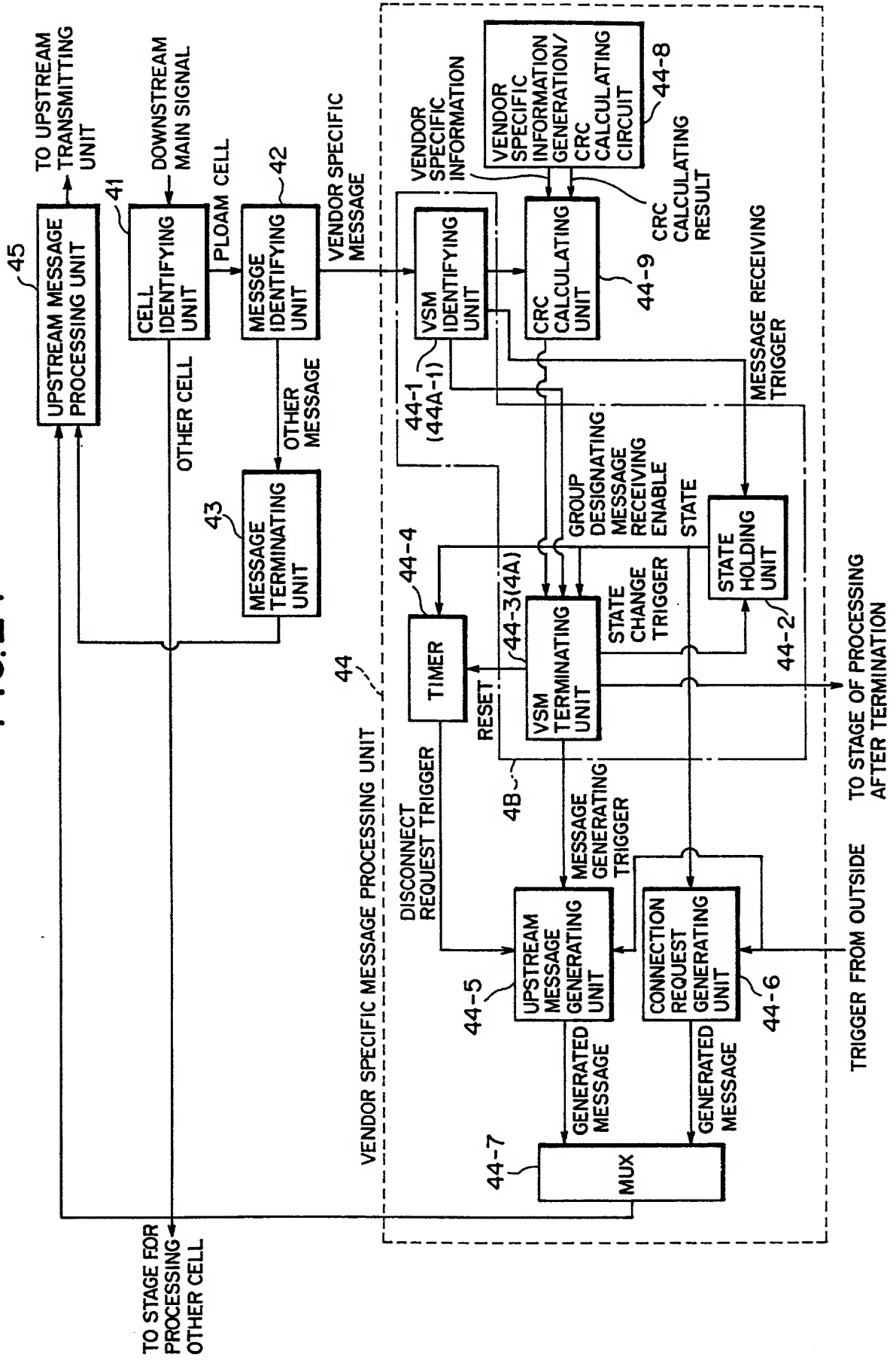


FIG. 26

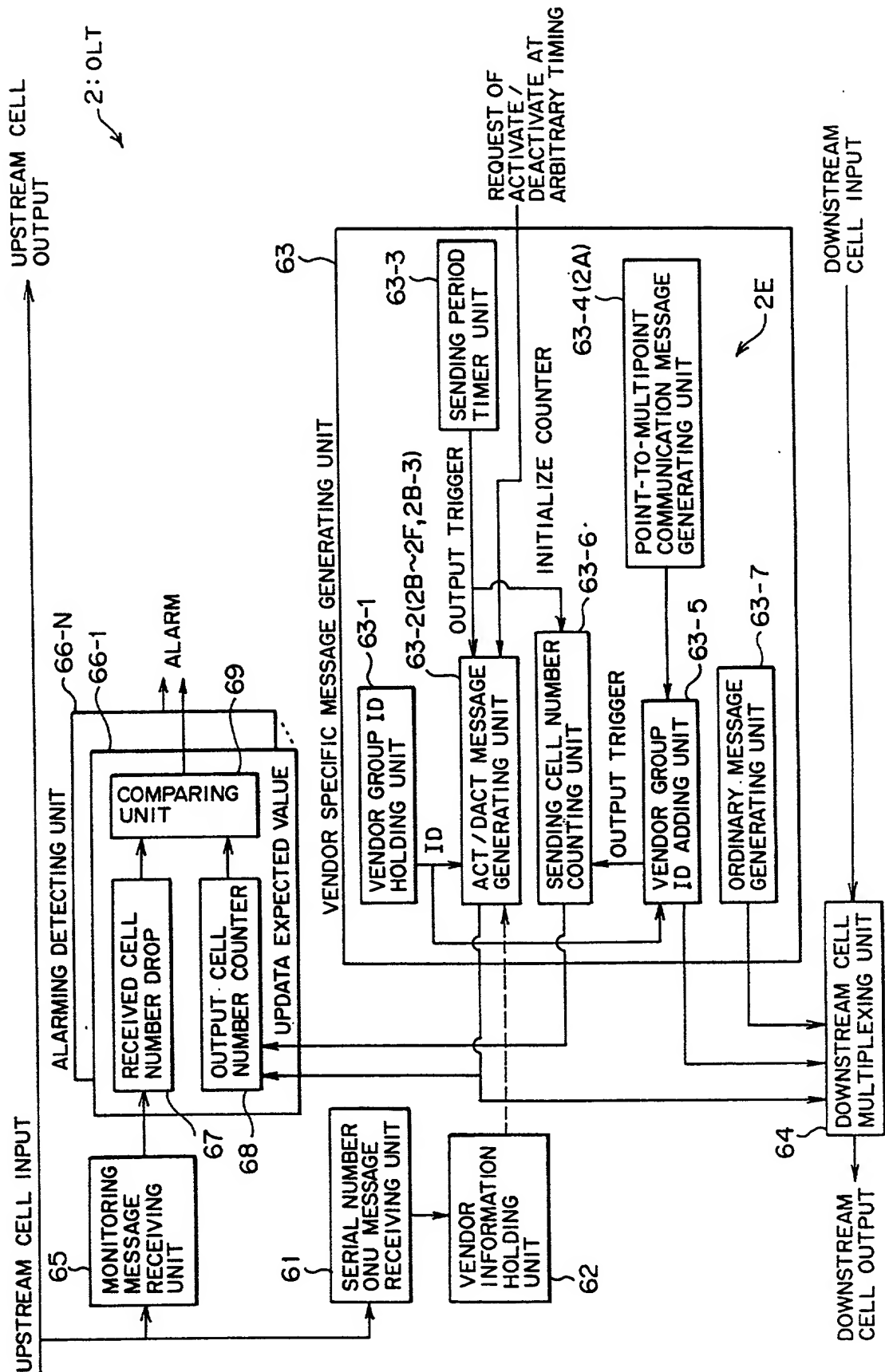


FIG.27A

91 (92): ACT/DACT MESSAGE
(MONITORING REPLY REQUEST MESSAGE)

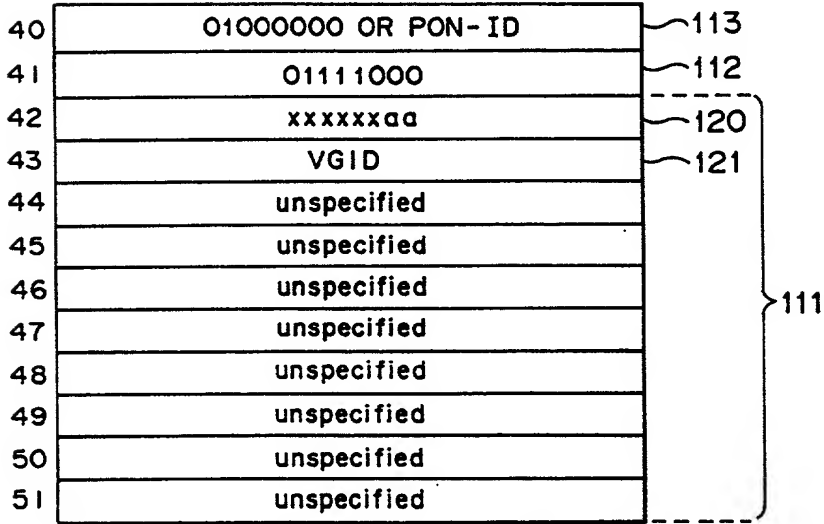


FIG.27B

aa	KIND OF MESSAGE
11	ACT MESSAGE
10 01	MONITORING REPLY REQUEST MESSAGE
00	DACT MESSAGE

FIG.28

93 : POINT-TO-MULTIPOINT
COMMUNICATION VSM

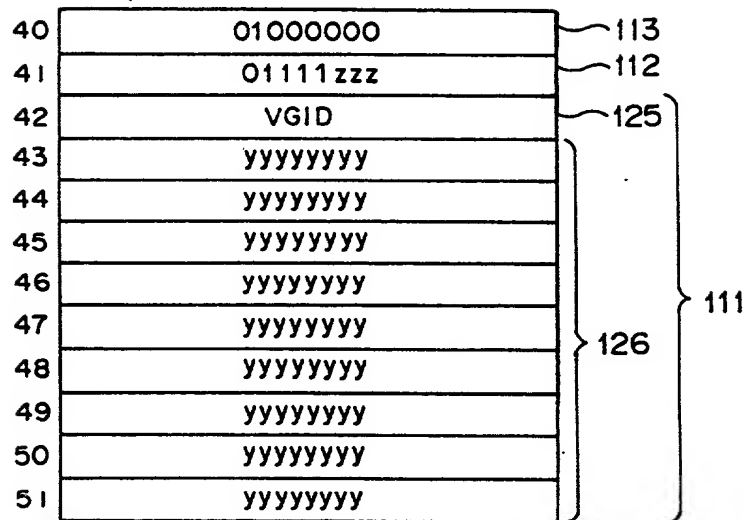


FIG.29

94 : MONITORING MESSAGE

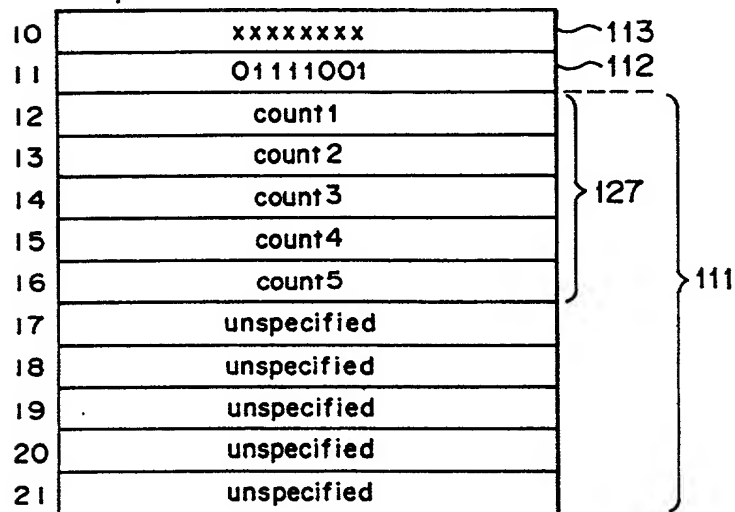


FIG. 30

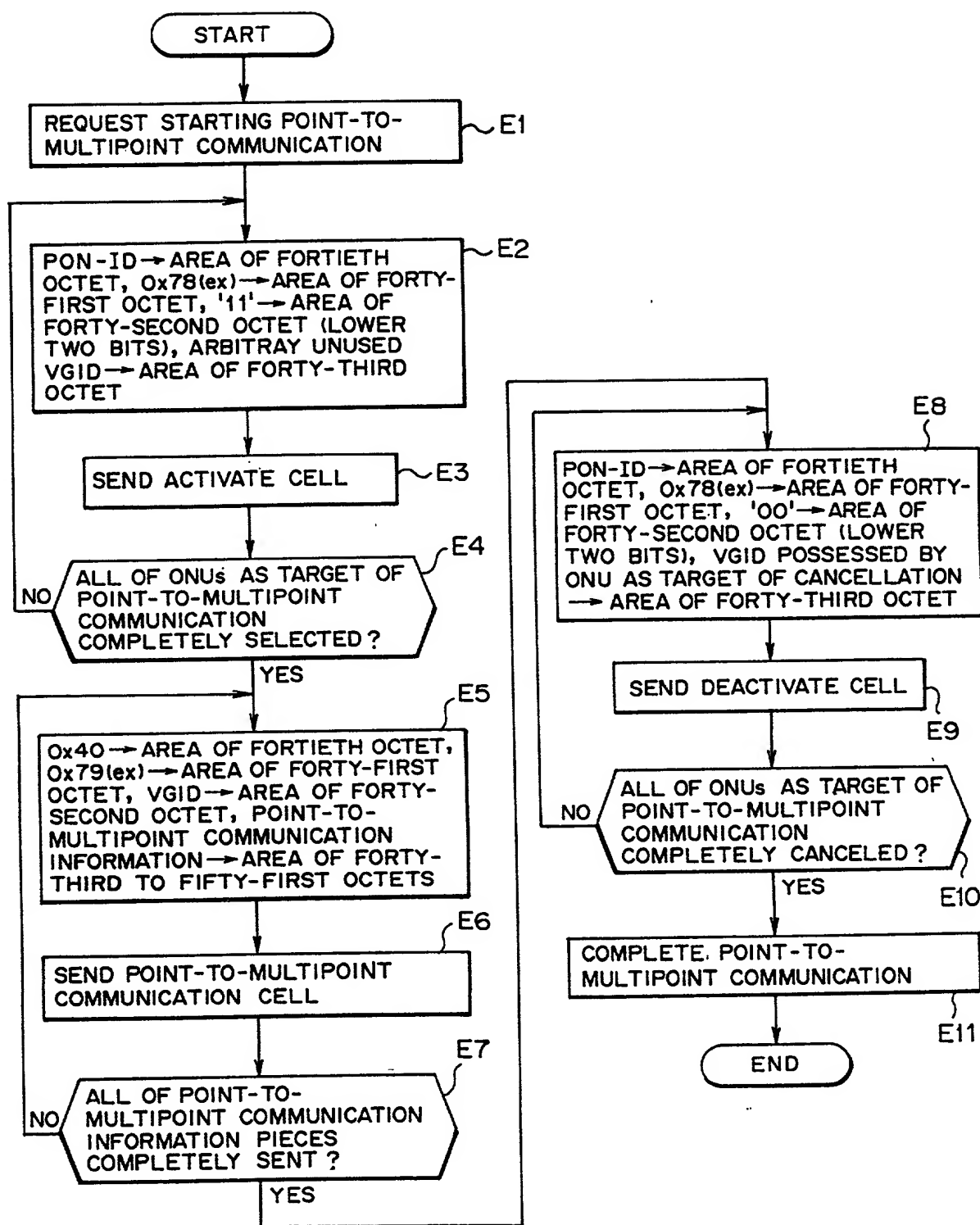


FIG. 31

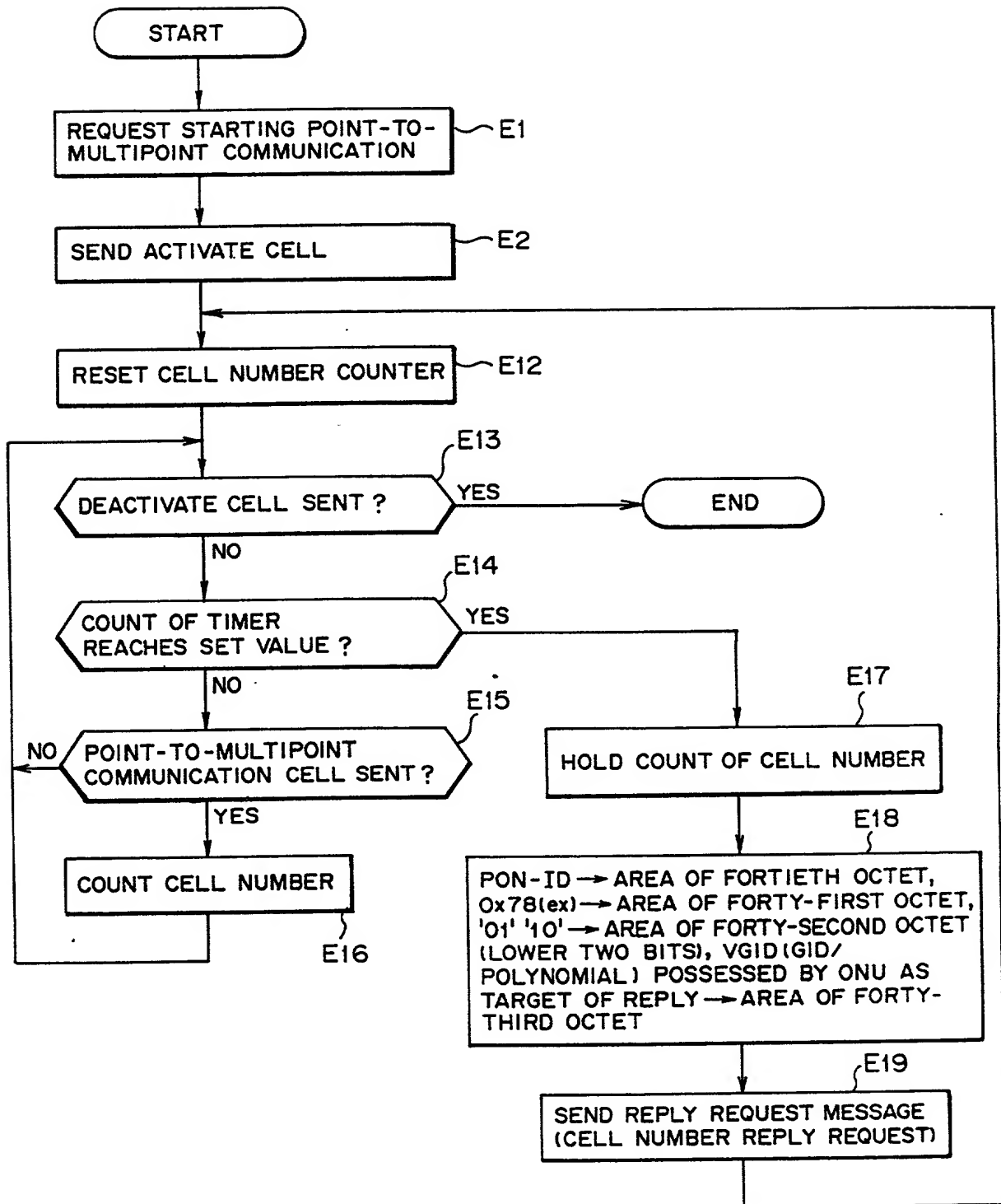
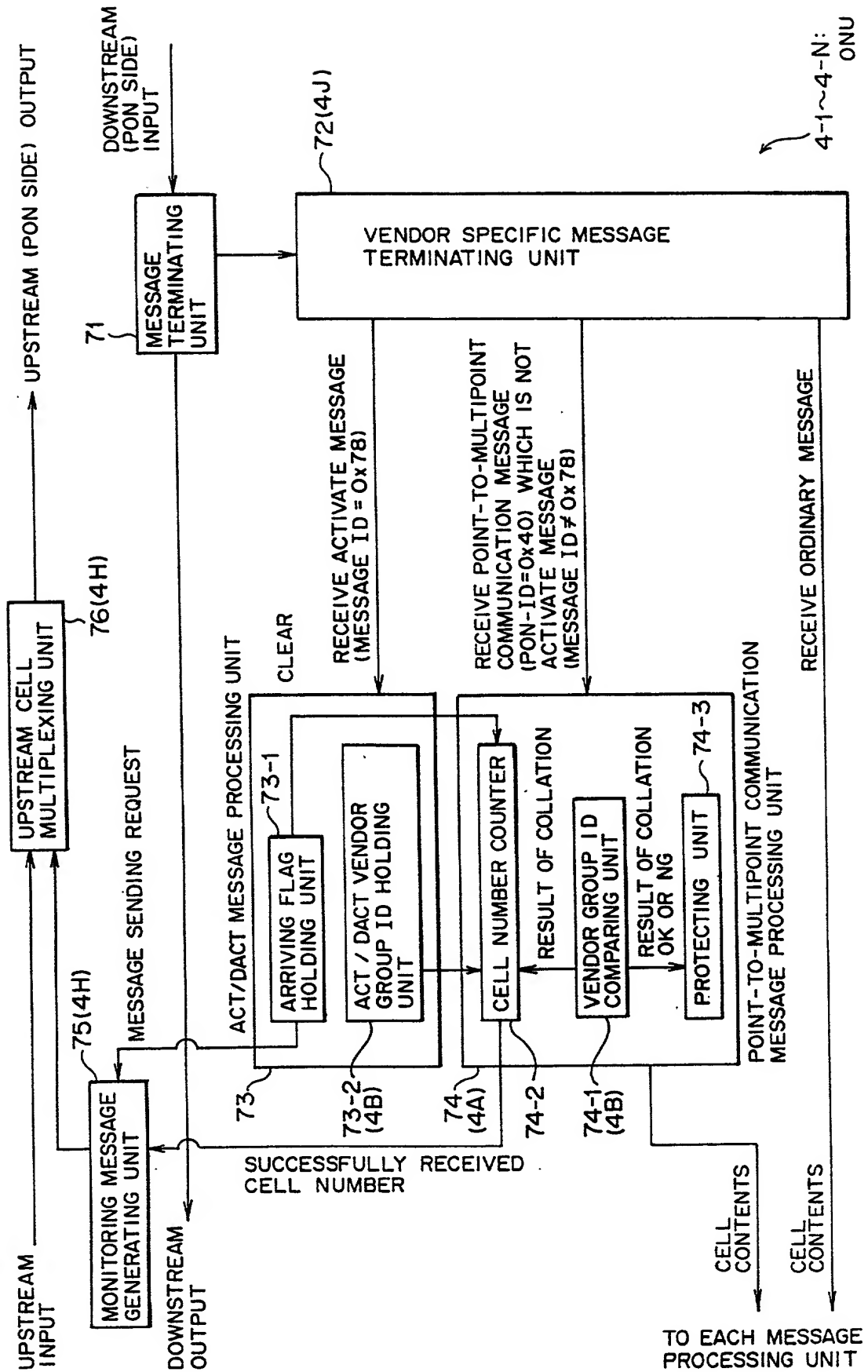


FIG. 32



Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100																																																																																																																																																																																																
Population (millions)	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	31.0	31.1	31.2	31.3	31.4

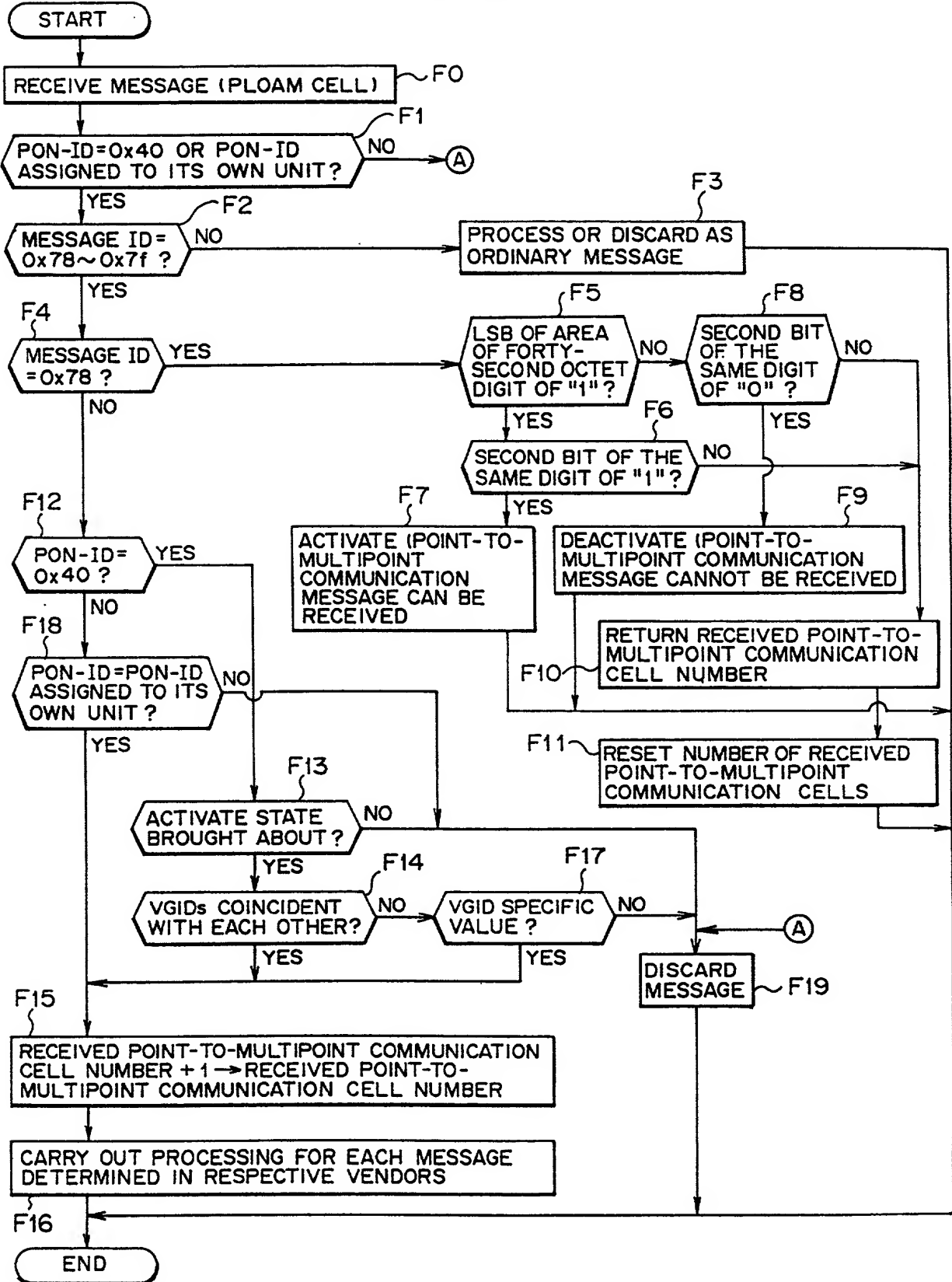


FIG. 34

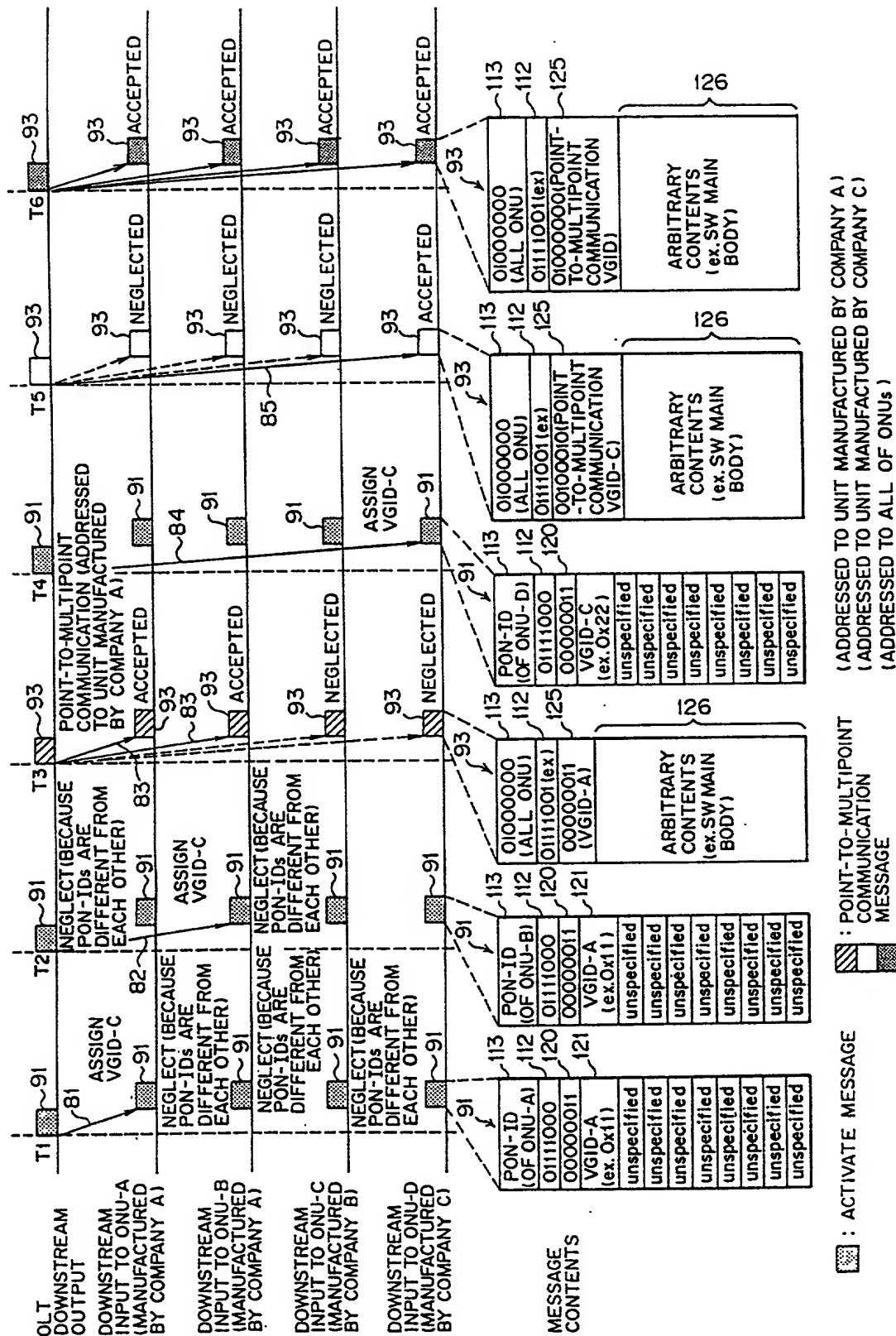


FIG. 35

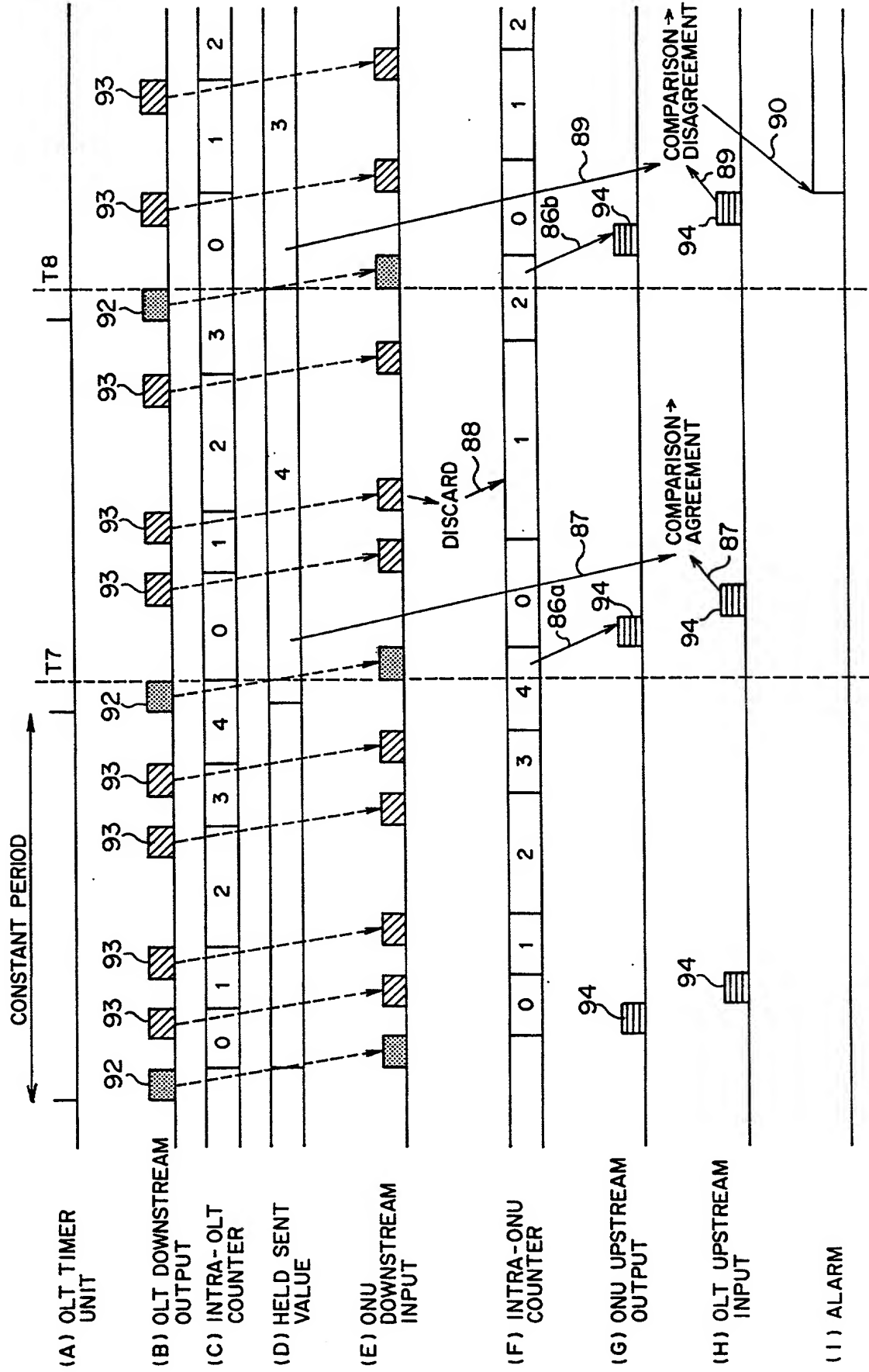


FIG. 36

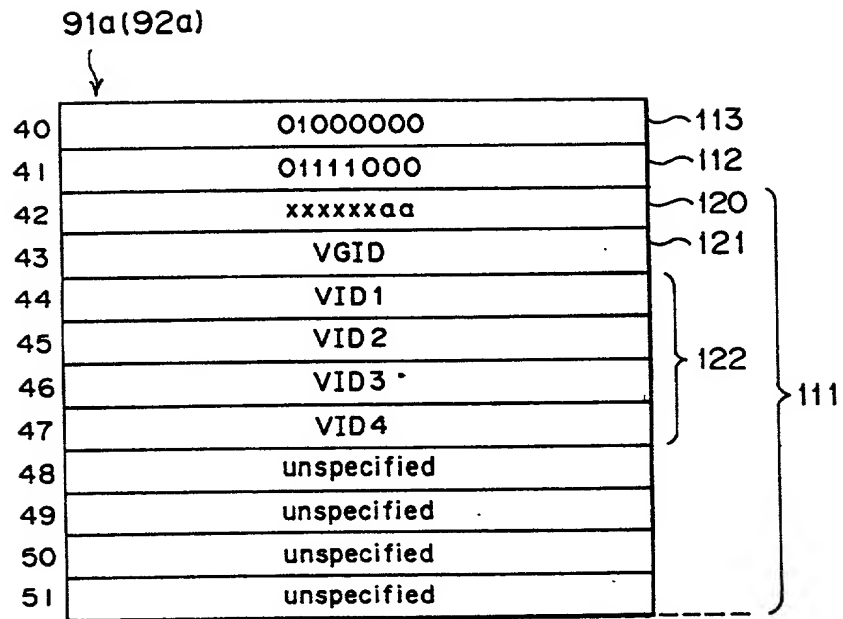
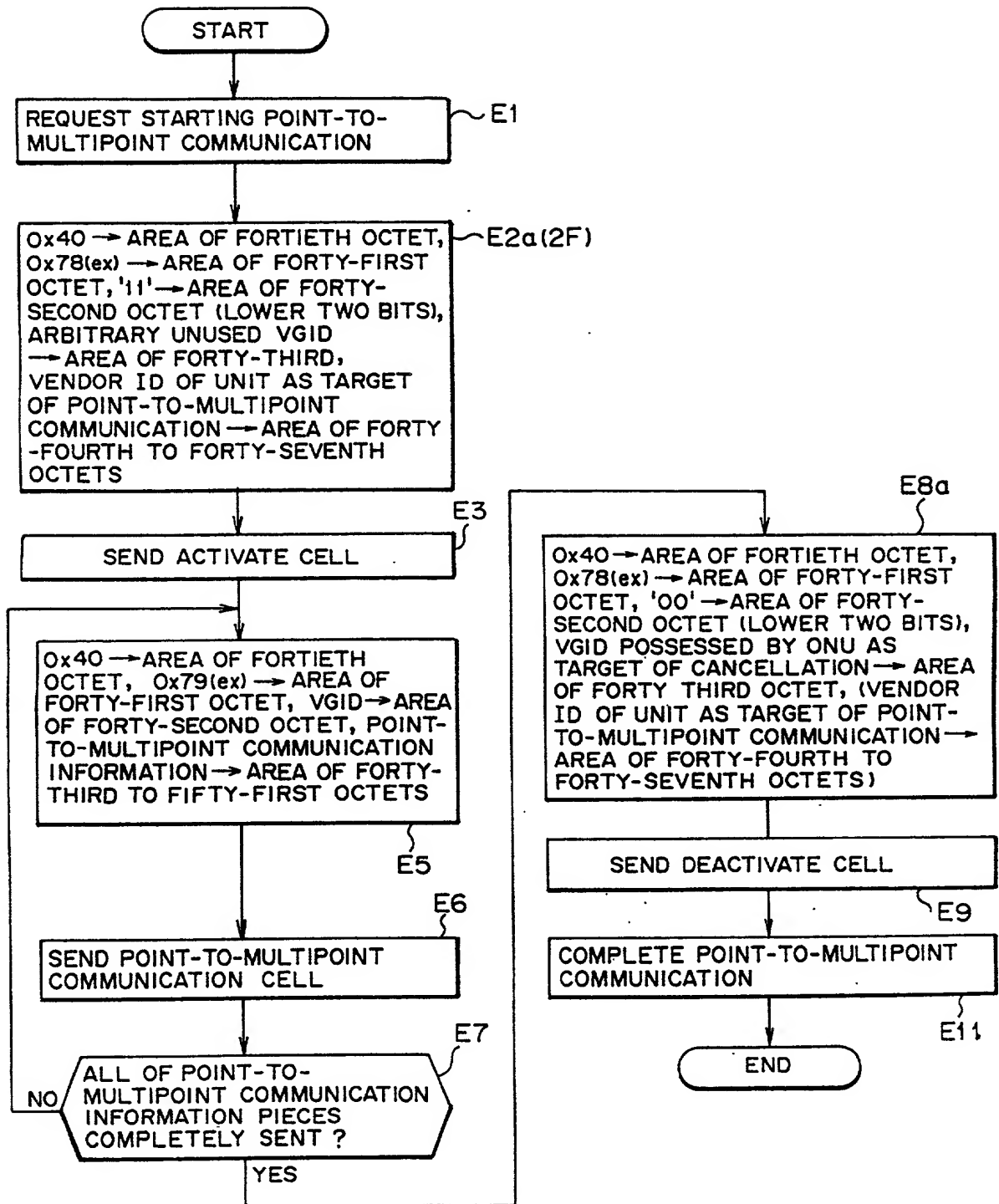


FIG. 37



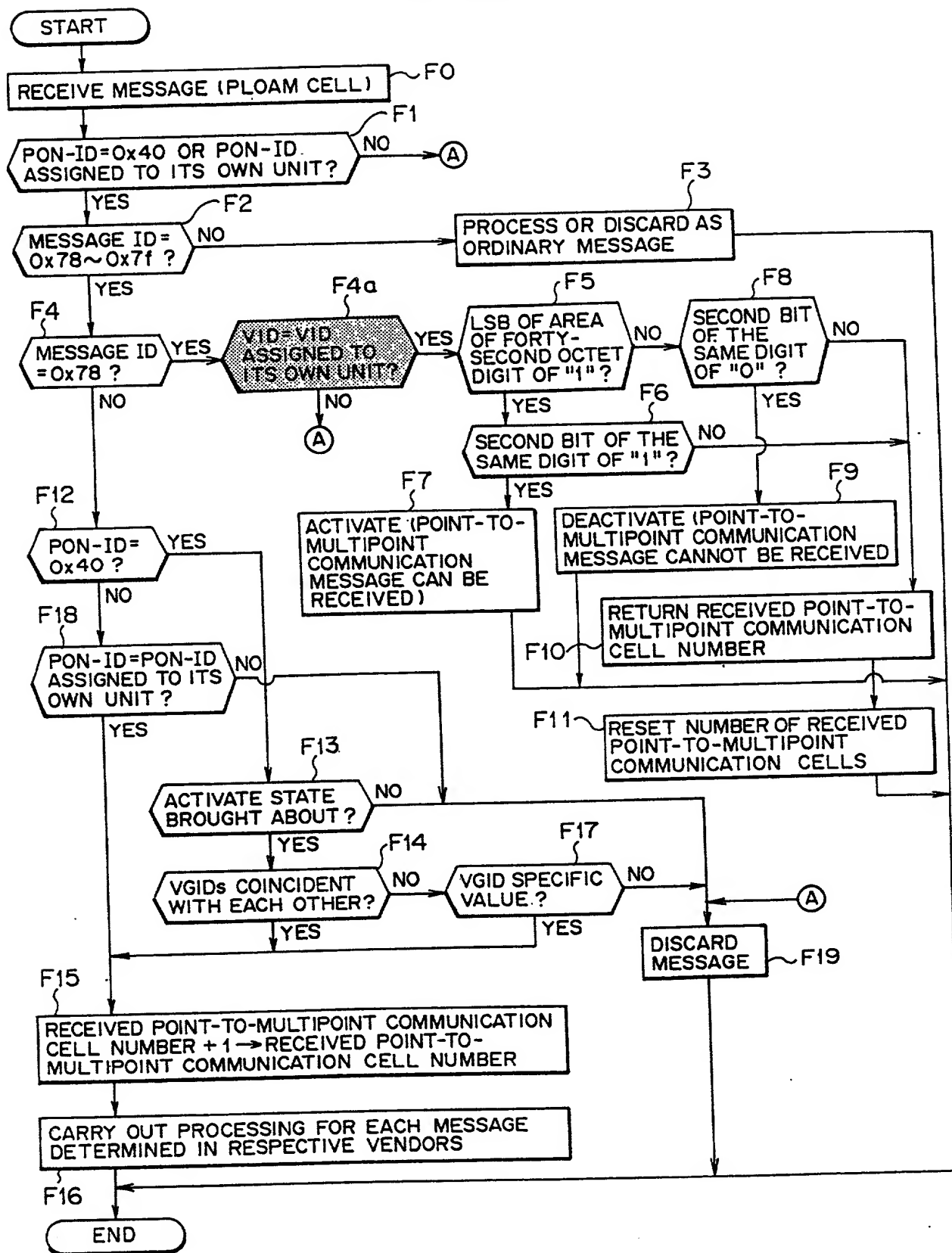
[illegible]

FIG. 39

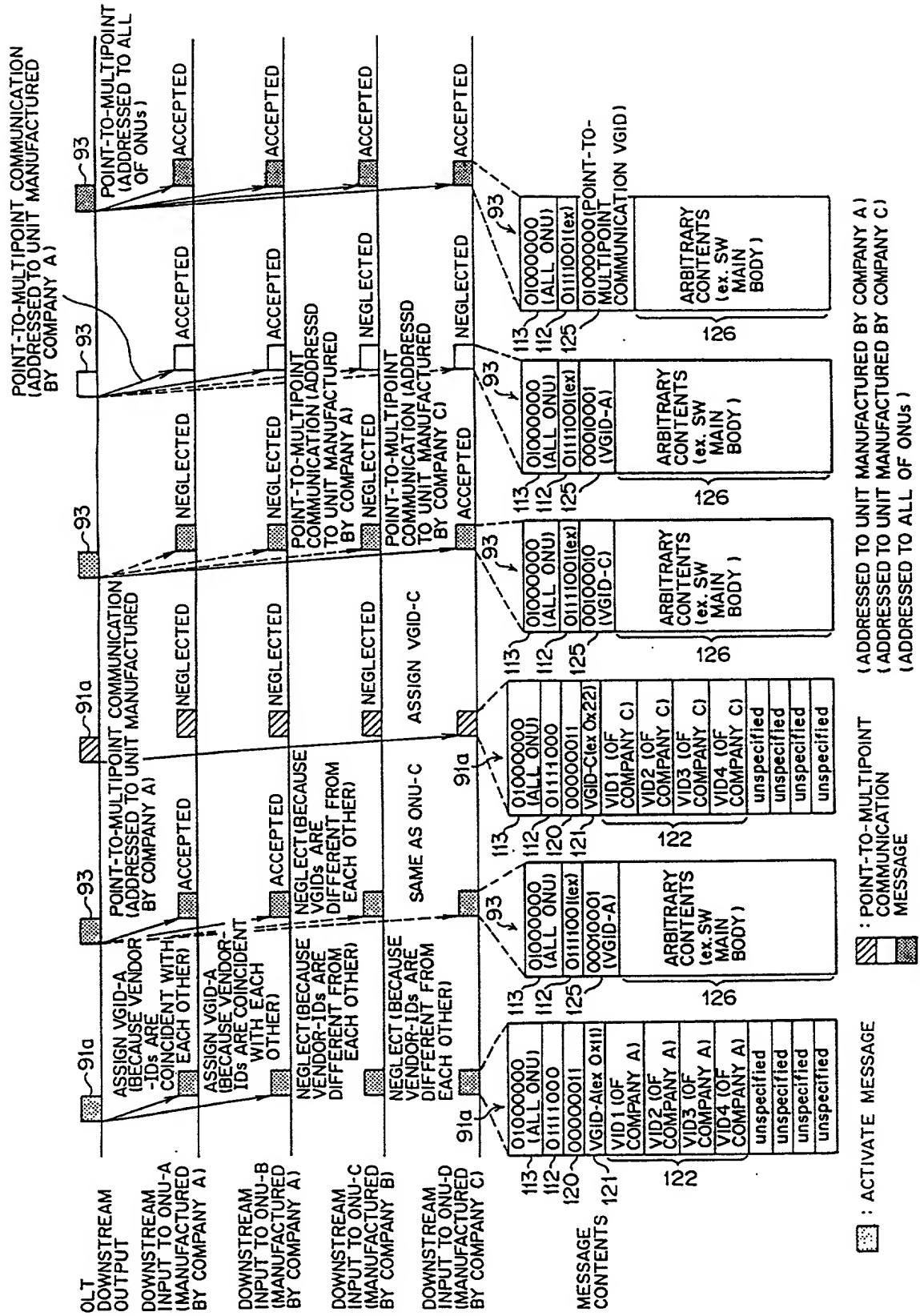


FIG. 40

91b (92b): ACT / DACT MESSAGE
(MONITORING REPLY REQUEST MESSAGE)

40	01000000								113
41	01111000								112
42	xxxxxxaa								120
43	VGID								121
44	g7	g6	g5	g4	g3	g2	g1	g0	123
45	g15	g14	g13	g12	g11	g10	g9	g8	
46	g23	g22	g21	g20	g19	g18	g17	g16	
47	g31	g30	g29	g28	g27	g26	g25	g24	
48	g39	g38	g37	g36	g35	g34	g33	g32	
49	g47	g46	g45	g44	g43	g42	g41	g40	
50	g55	g54	g53	g52	g51	g50	g49	g48	
51	g63	g62	g61	g60	g59	g58	g57	g56	

FIG. 41

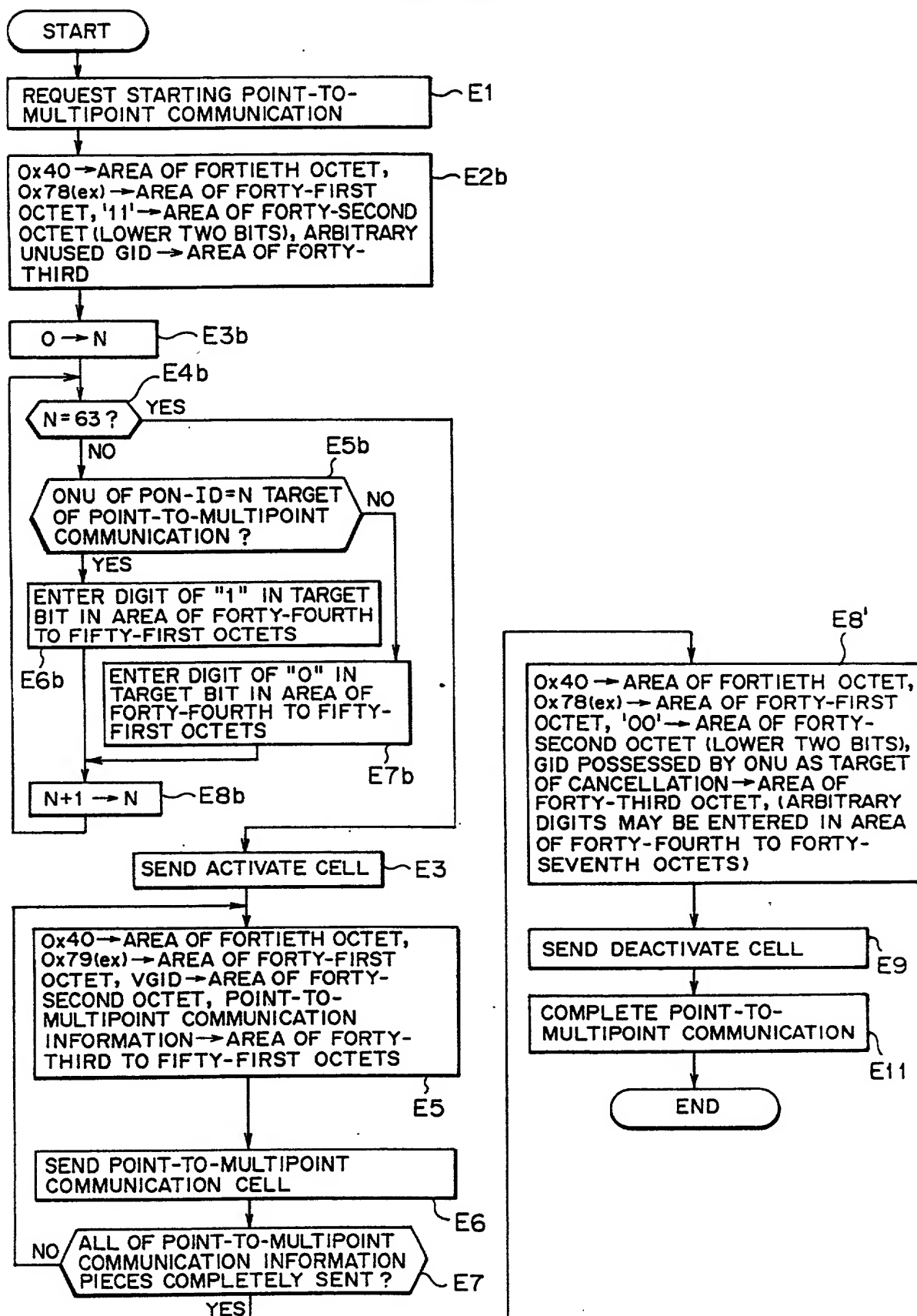
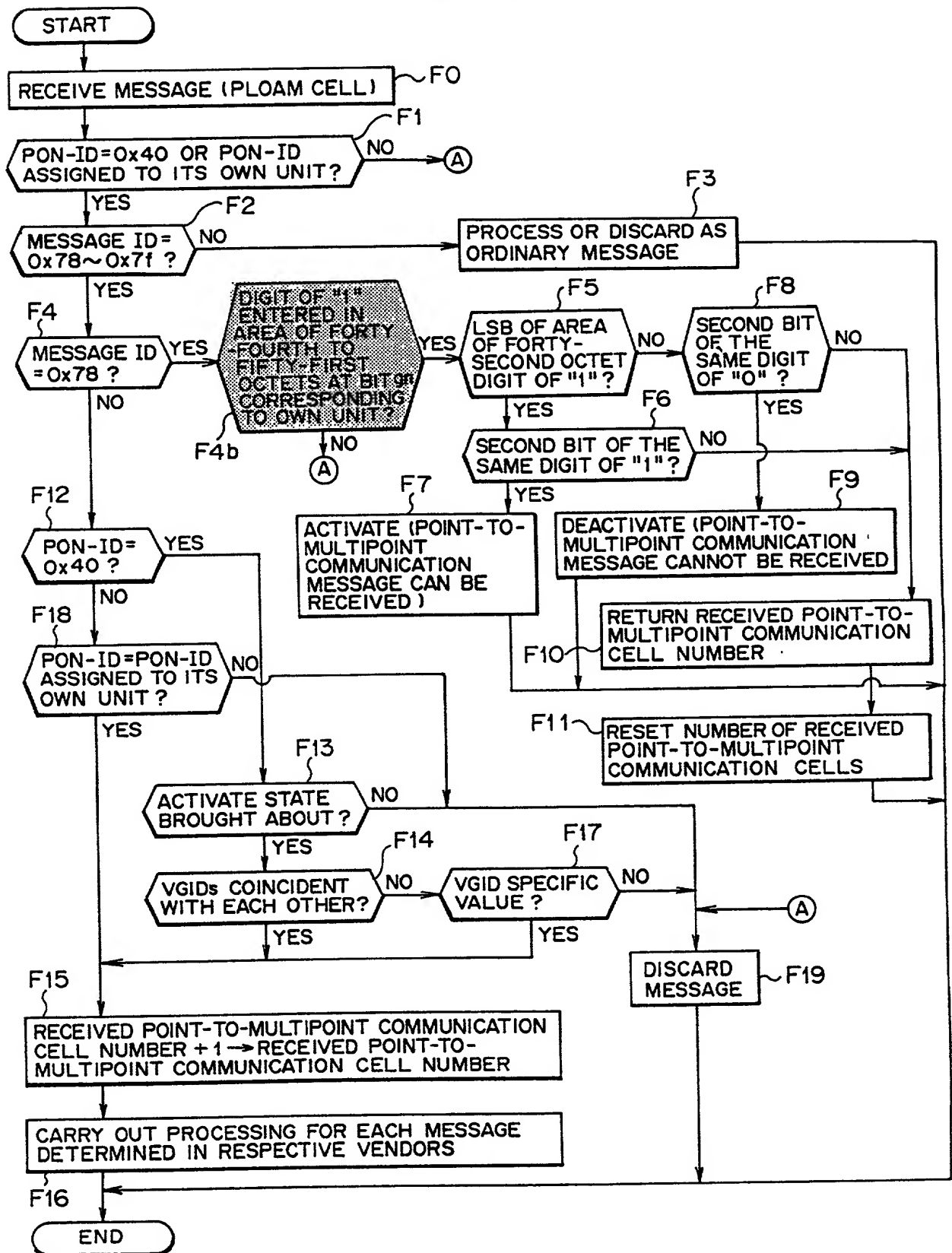


FIG. 42



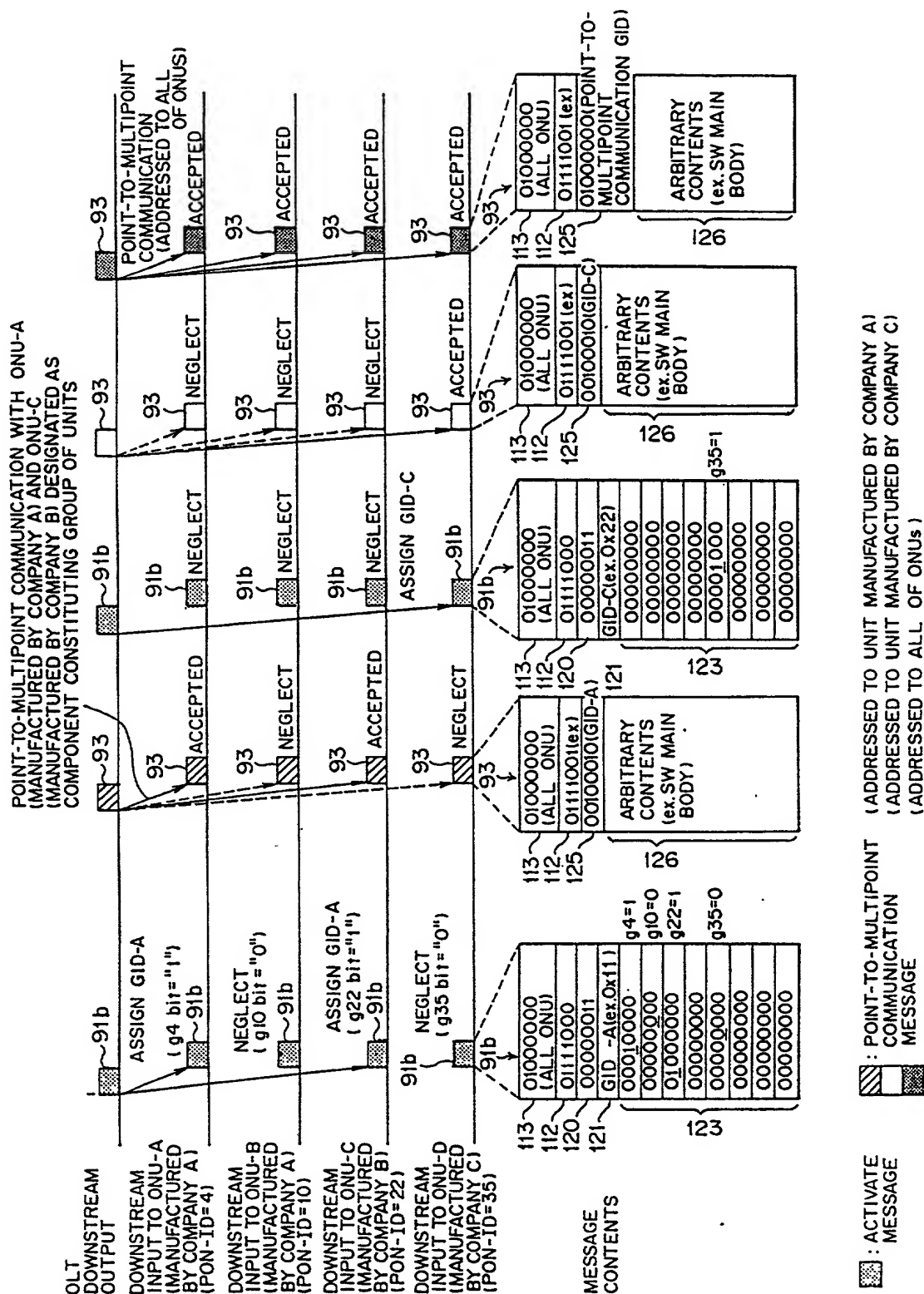


FIG. 44

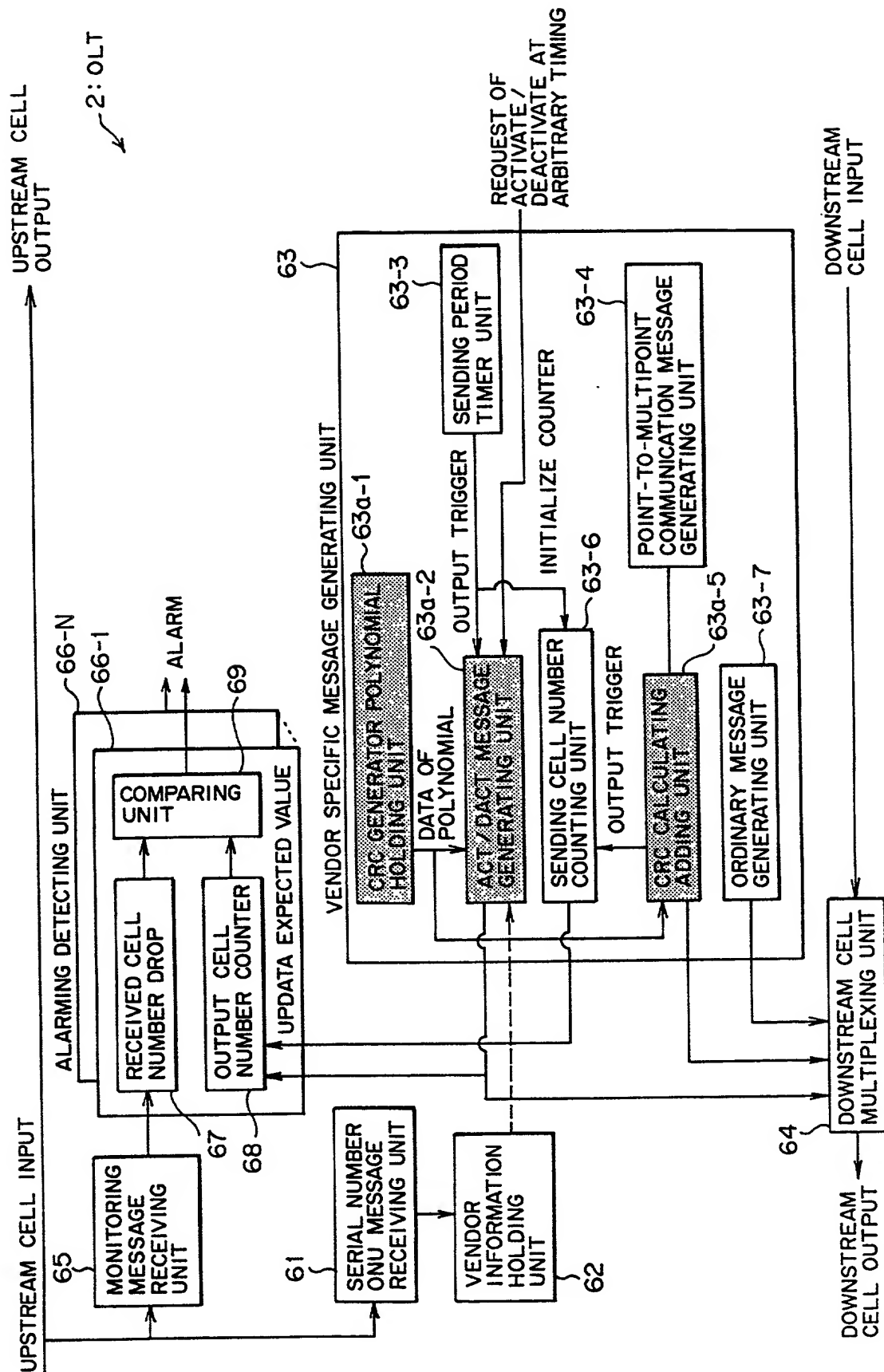


FIG. 45

91c (92c): ACT/DACT MESSAGE
(MONITORING REPLY REQUEST MESSAGE)

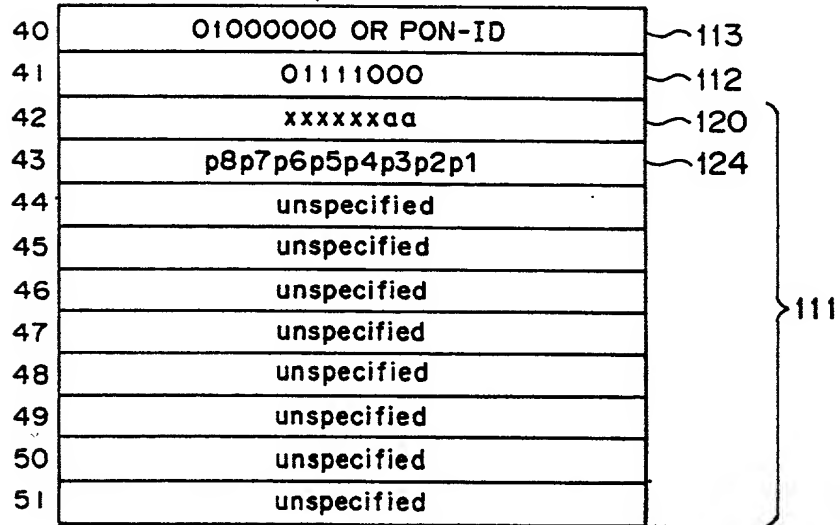


FIG. 46

93a: POINT-TO-MULTIPOINT
COMMUNICATION VSM

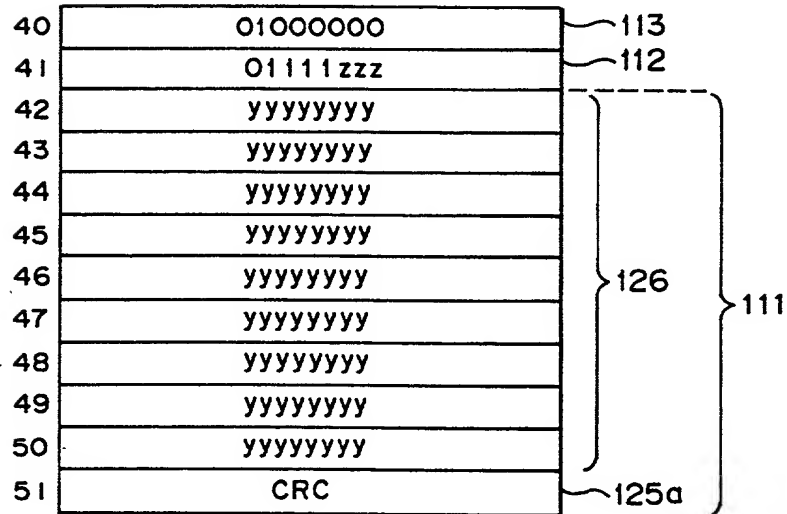


FIG.47

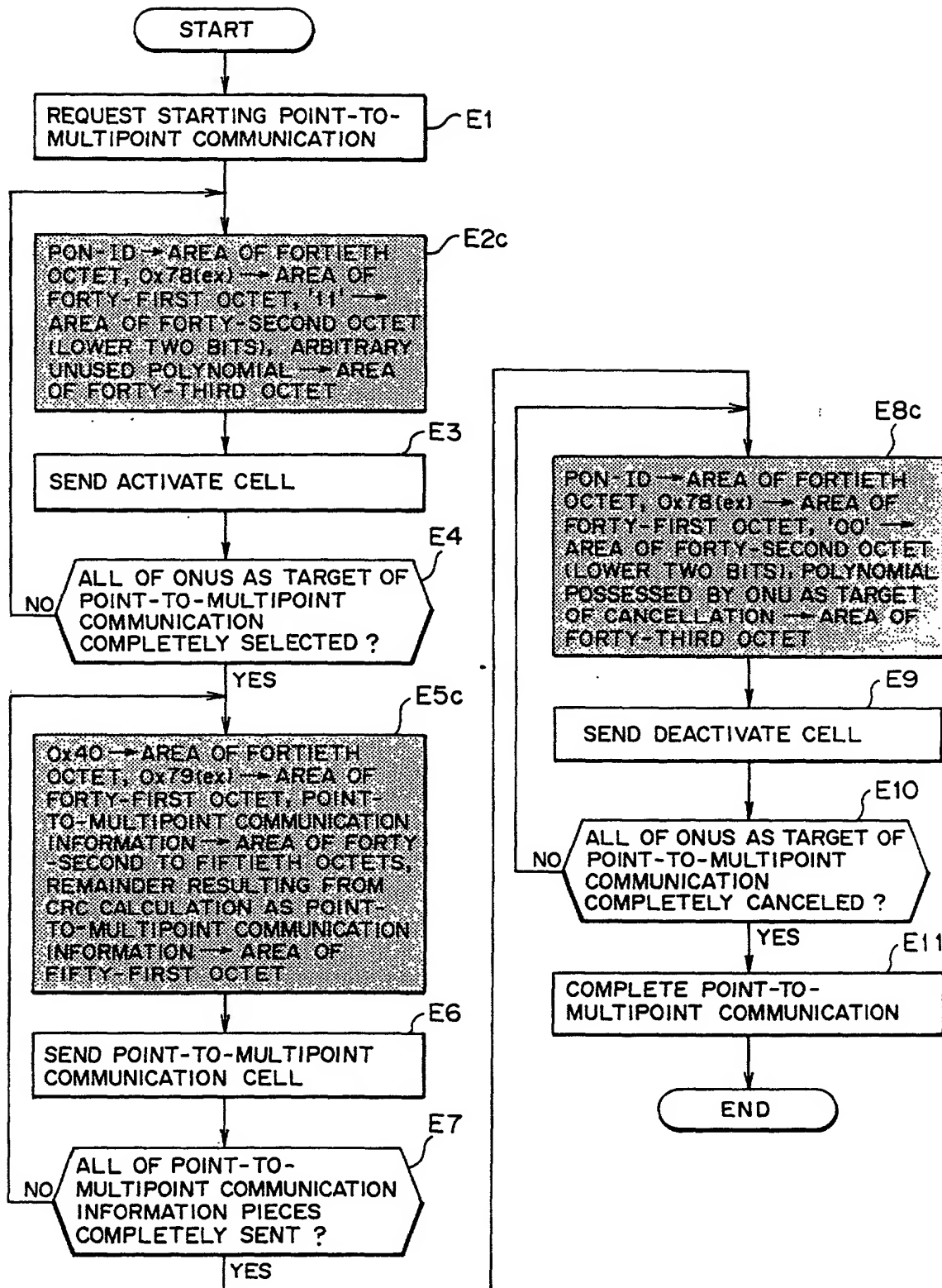


FIG. 47

FIG. 48

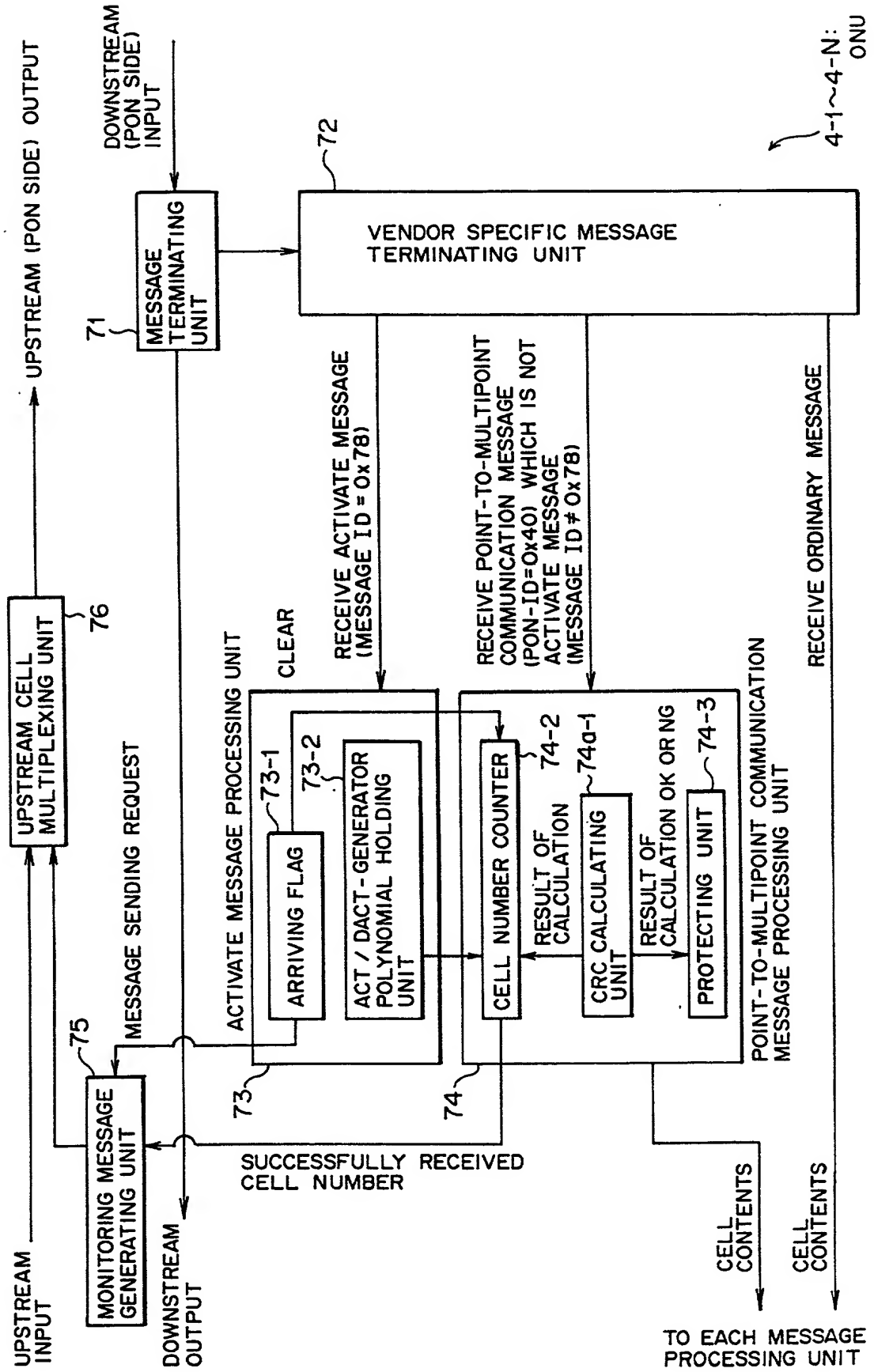


FIG.50

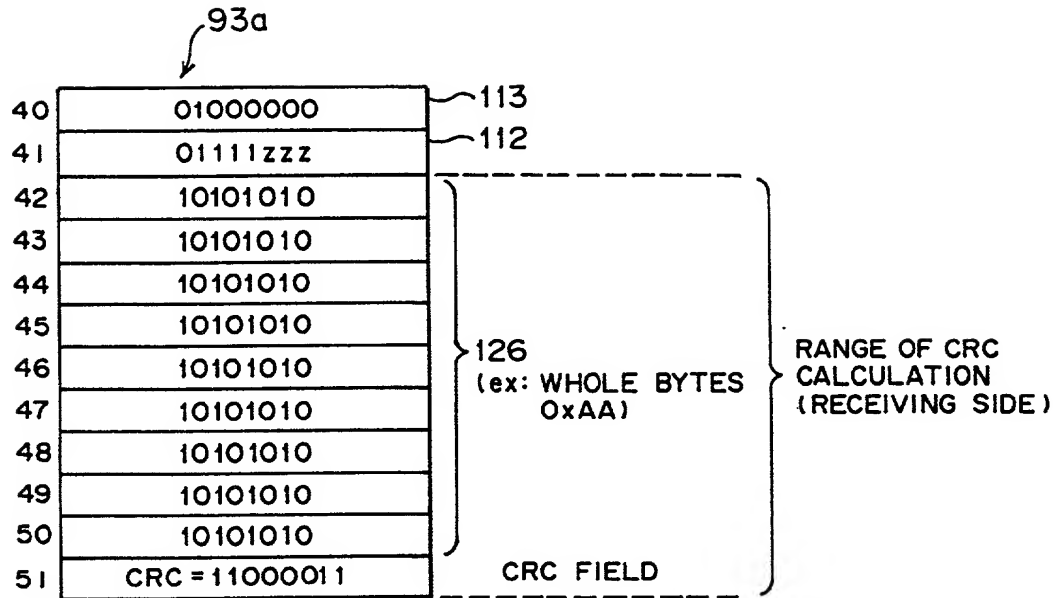
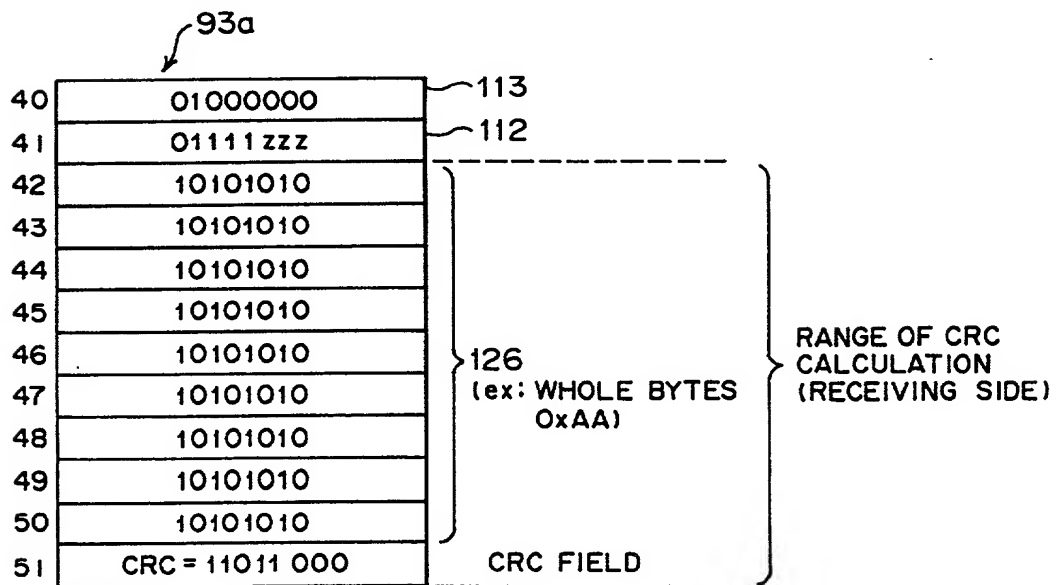


FIG.51



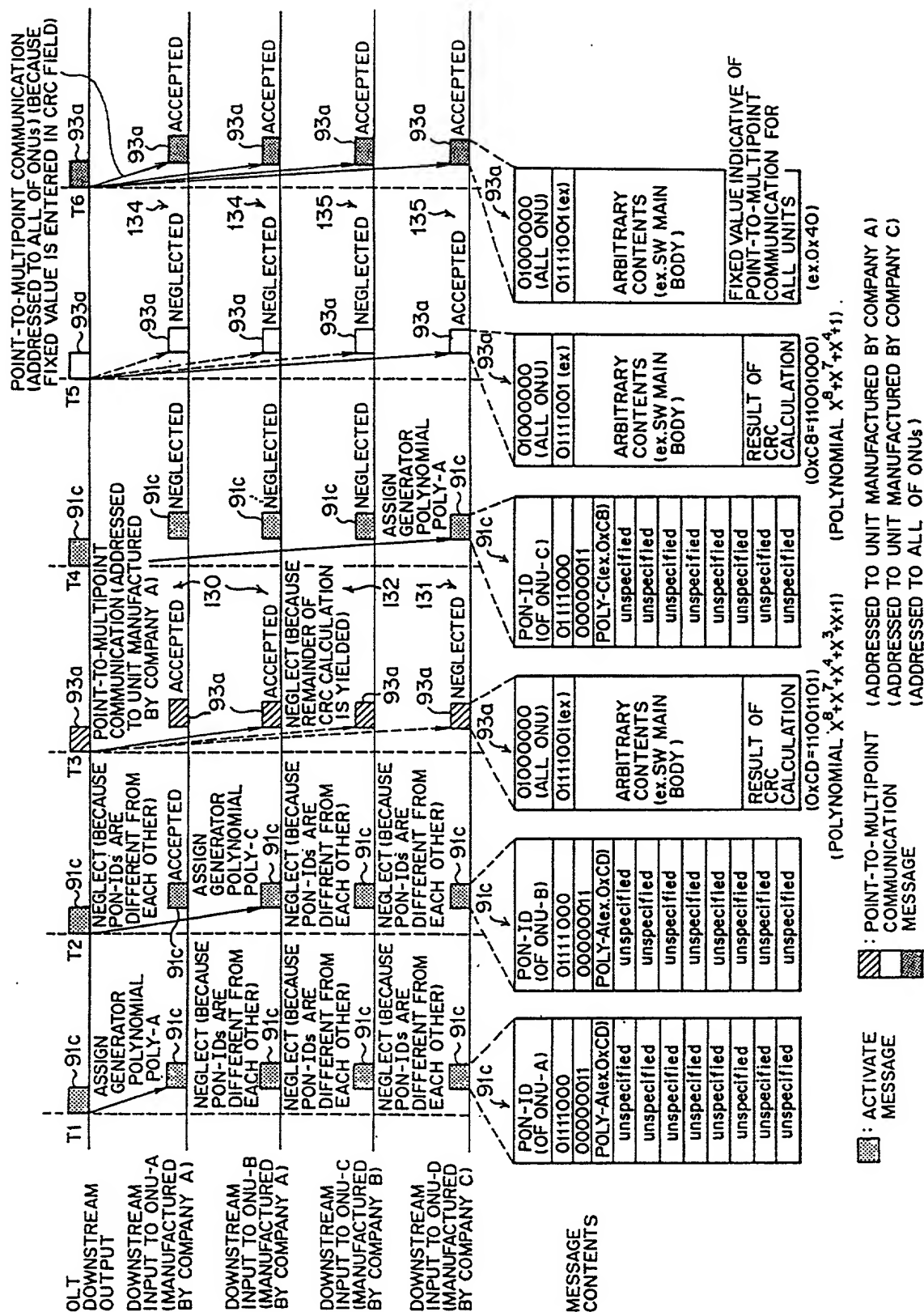


FIG. 53

91d(92d): ACT/DACT MESSAGE
(MONITORING REPLY REQUEST MESSAGE)

40	01000000 OR PON-ID	113
41	01111000	112
42	xxxxxxaa	120
43	p8p7p6p5p4p3p2p1	124
44	VID 1	122
45	VID 2	
46	VID 3	
47	VID 4	
48	unspecified	
49	unspecified	
50	unspecified	
51	unspecified	

FIG. 54

91e(92e): ACT / DACT MESSAGE
(MONITORING REPLY REQUEST MESSAGE)

40	01000000 OR PON-ID	113
41	01111000	112
42	xxxxxxaa	120
43	p8p7p6p5p4p3p2p1	124
44	g7 g6 g5 g4 g3 g2 g1 g0	123
45	g15 g14 g13 g12 g11 g10 g9 g8	
46	g23 g22 g21 g20 g19 g18 g17 g16	
47	g31 g30 g29 g28 g27 g26 g25 g24	
48	g39 g38 g37 g36 g35 g34 g33 g32	
49	g47 g46 g45 g44 g43 g42 g41 g40	
50	g55 g54 g53 g52 g51 g50 g49 g48	
51	g63 g62 g61 g60 g59 g58 g57 g56	

FIG. 55

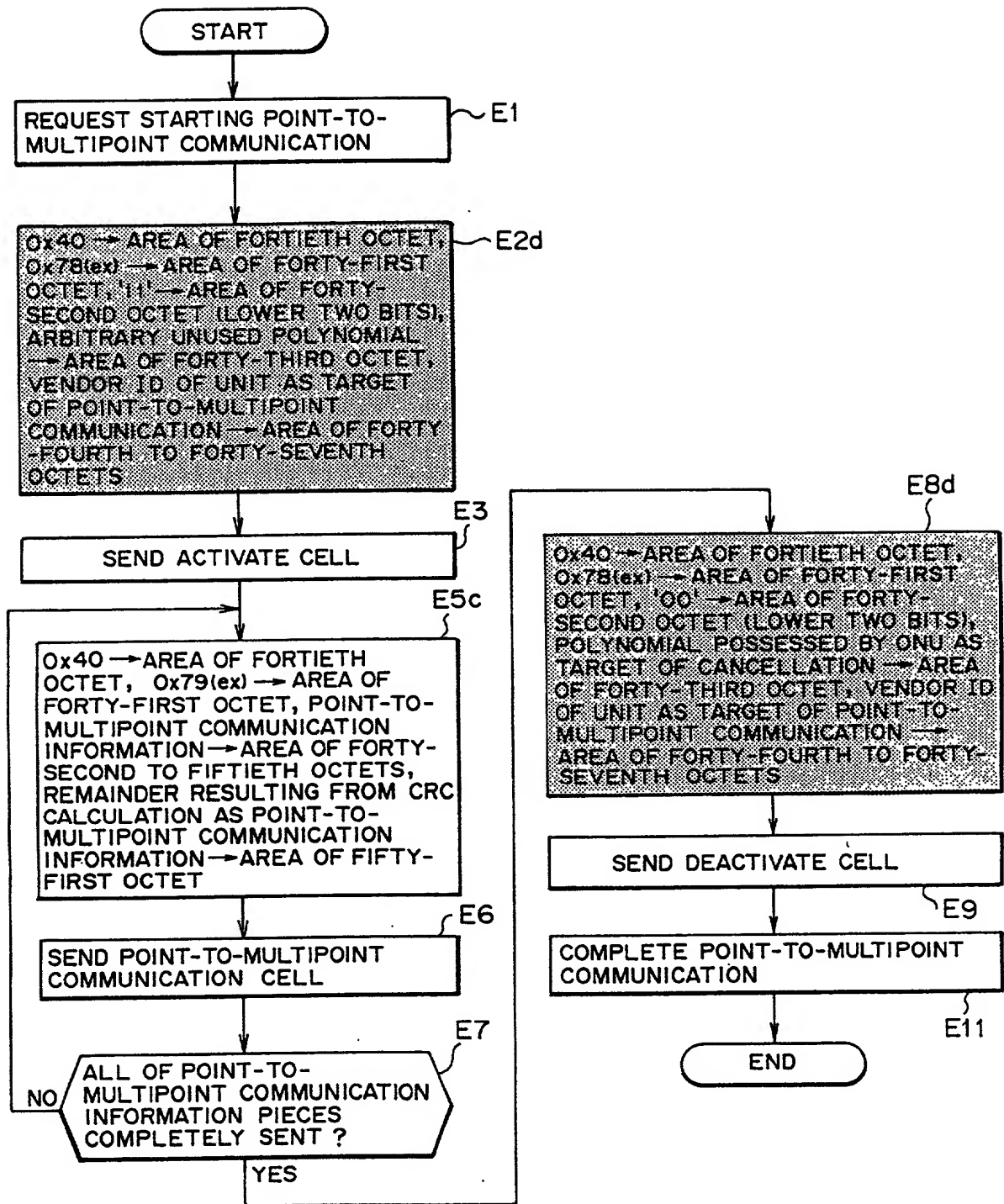


FIG. 56

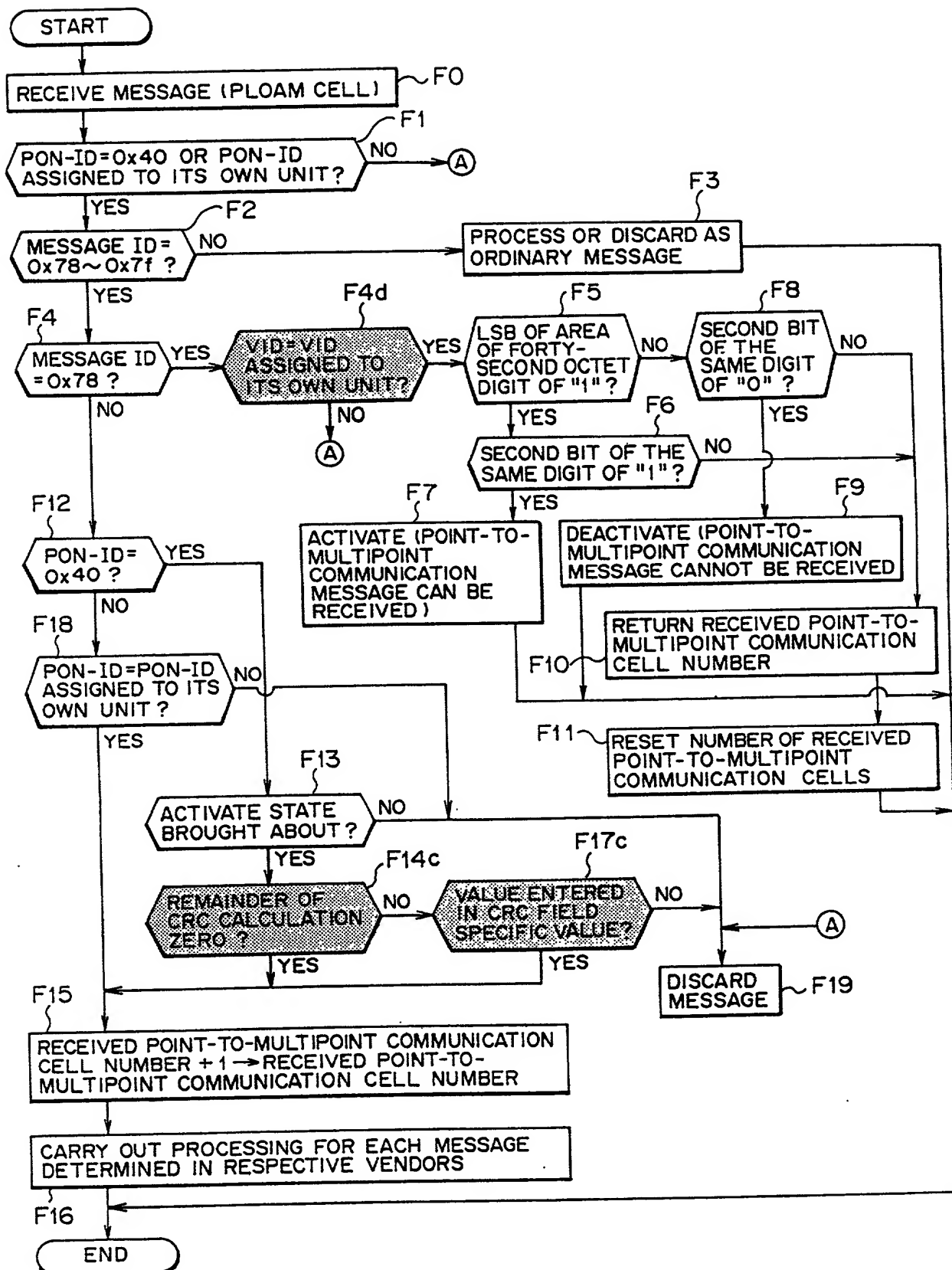


FIG. 58

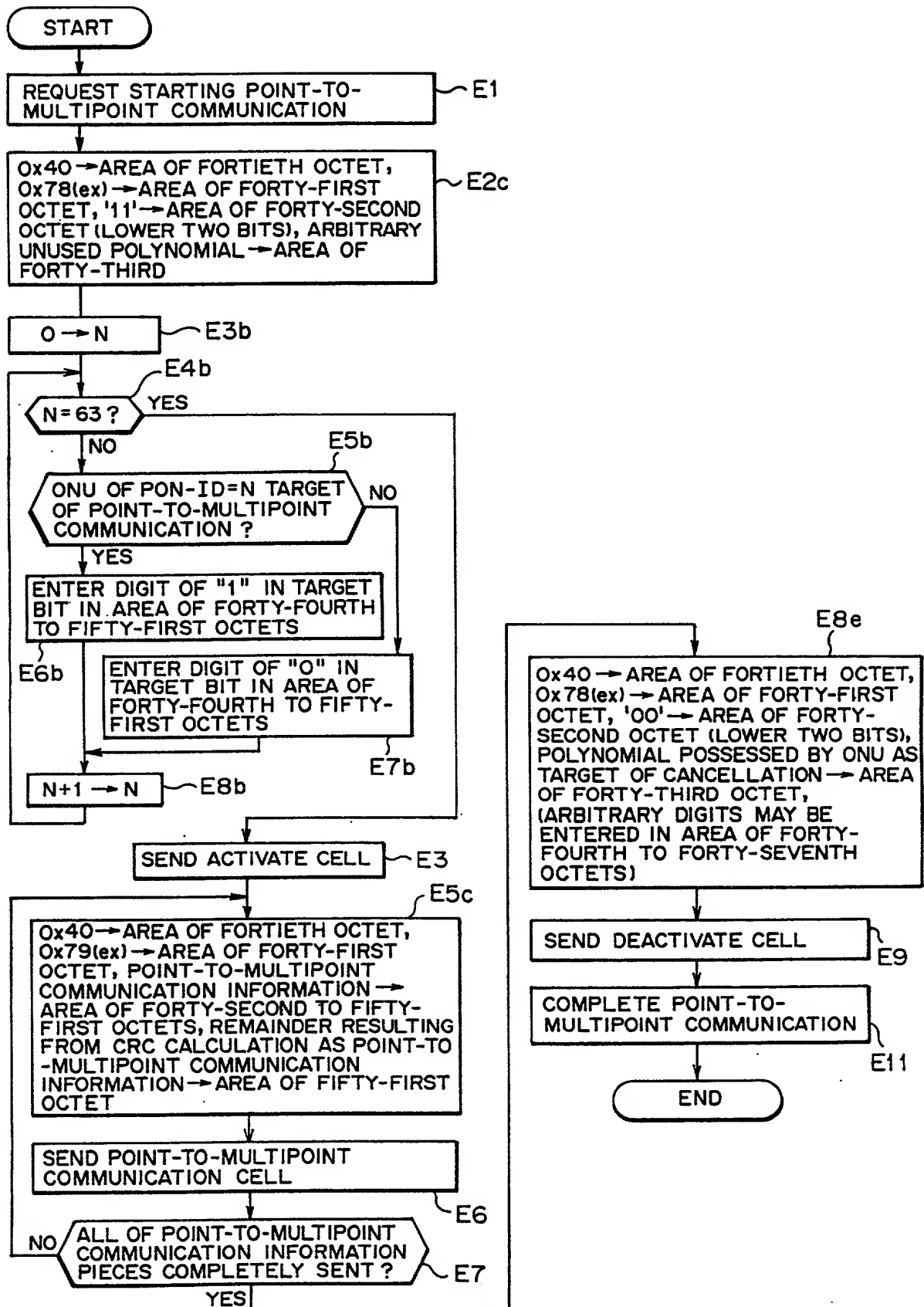


FIG. 59

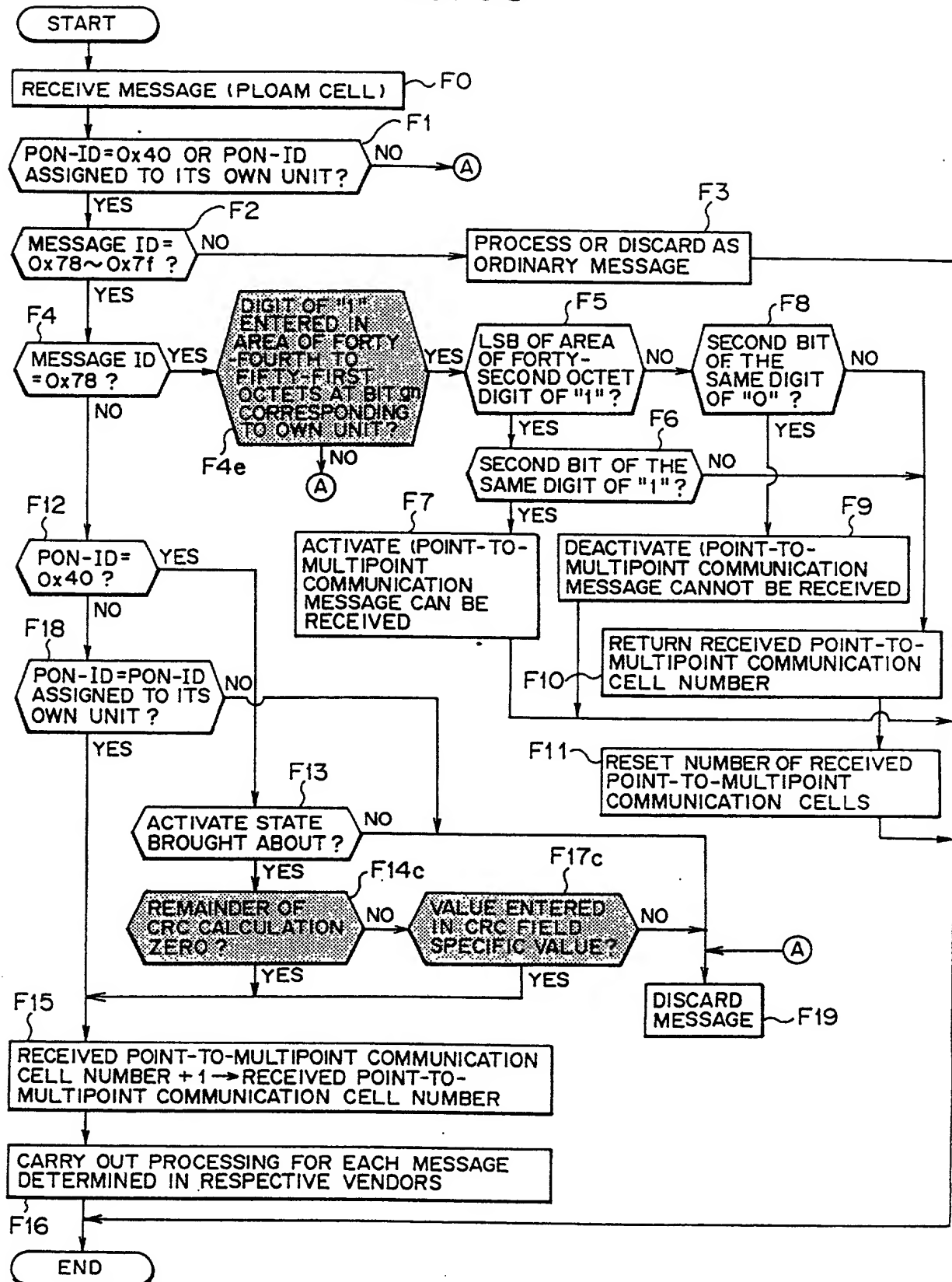


FIG. 61

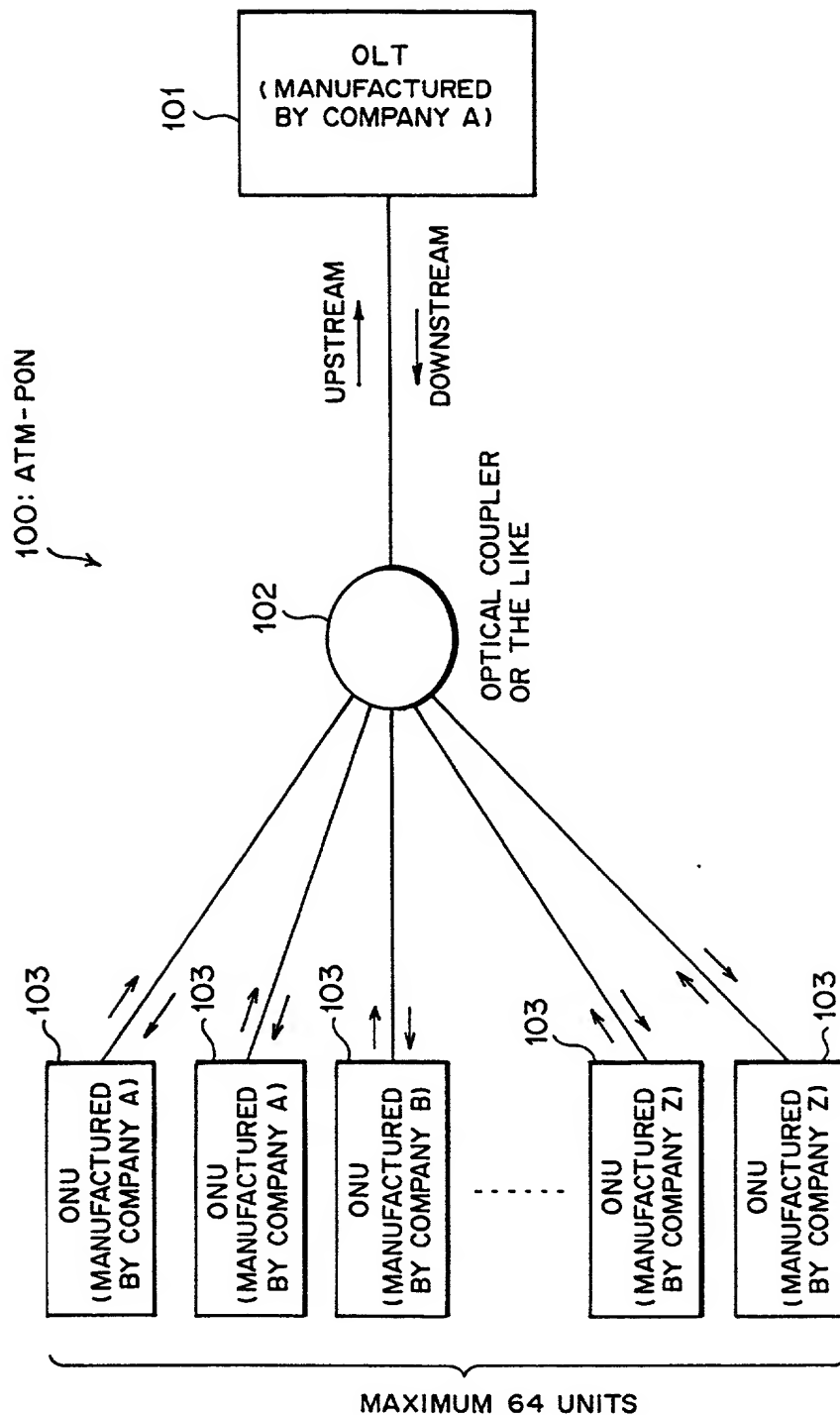


FIG. 62A

DOWNSTREAM MESSAGE

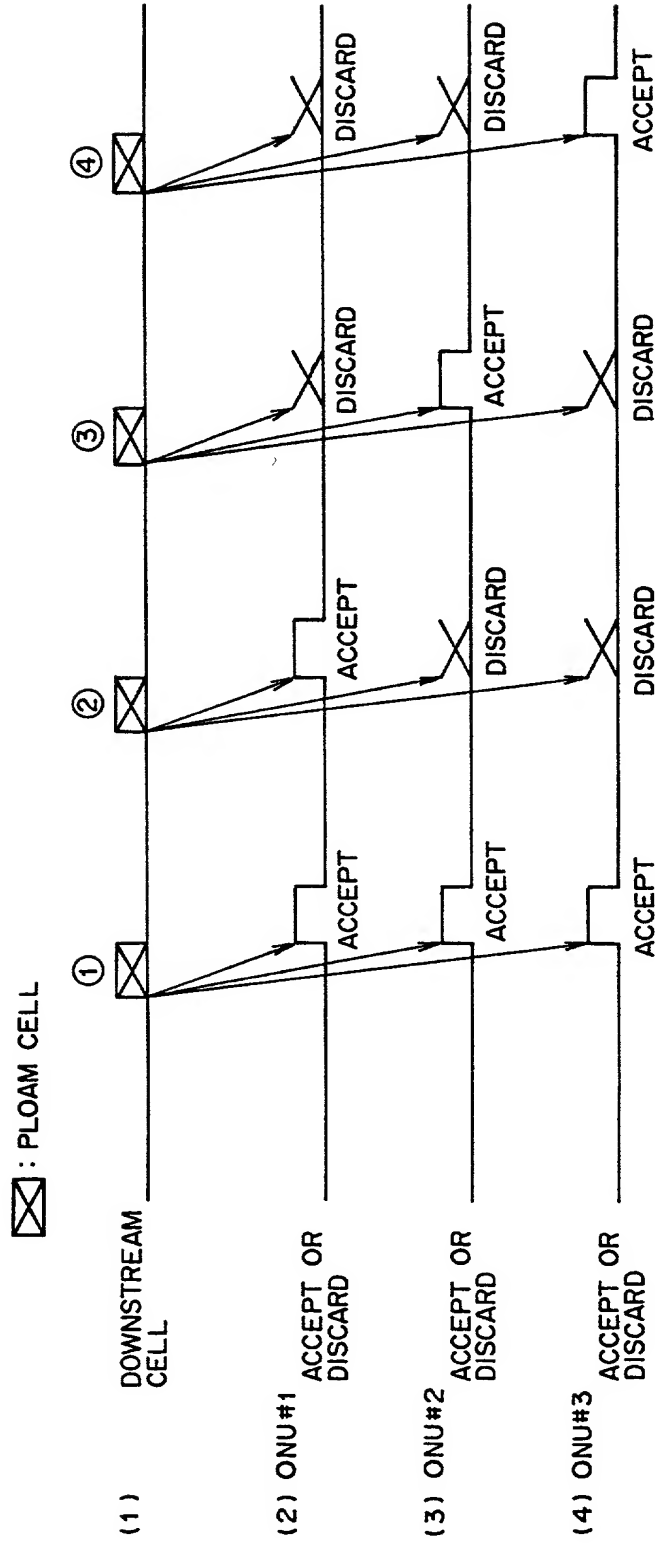
BYTE	CONTENTS	DETAIL	
40	xxxxxxx	INDIVIDUAL PON ID OR BROADCAST TYPE PON ID=0x40	113
41	01111zzz	MESSAGE ID OF VENDOR SPECIFIC MESSAGE (LOWER THREE BIT MAY BE ARBITRARILY UTILIZED)	112
42	yyyyyyyy	111: MESSAGE FIELD ALLOWED TO BE UTILIZED ARBITRARILY BY EACH VENDOR (TEN BYTES)	112
43	yyyyyyyy		
44	yyyyyyyy		
45	yyyyyyyy		
46	yyyyyyyy		
47	yyyyyyyy		
48	yyyyyyyy		
49	yyyyyyyy		
50	yyyyyyyy		
51	yyyyyyyy		

FIG. 62B

UPSTREAM MESSAGE

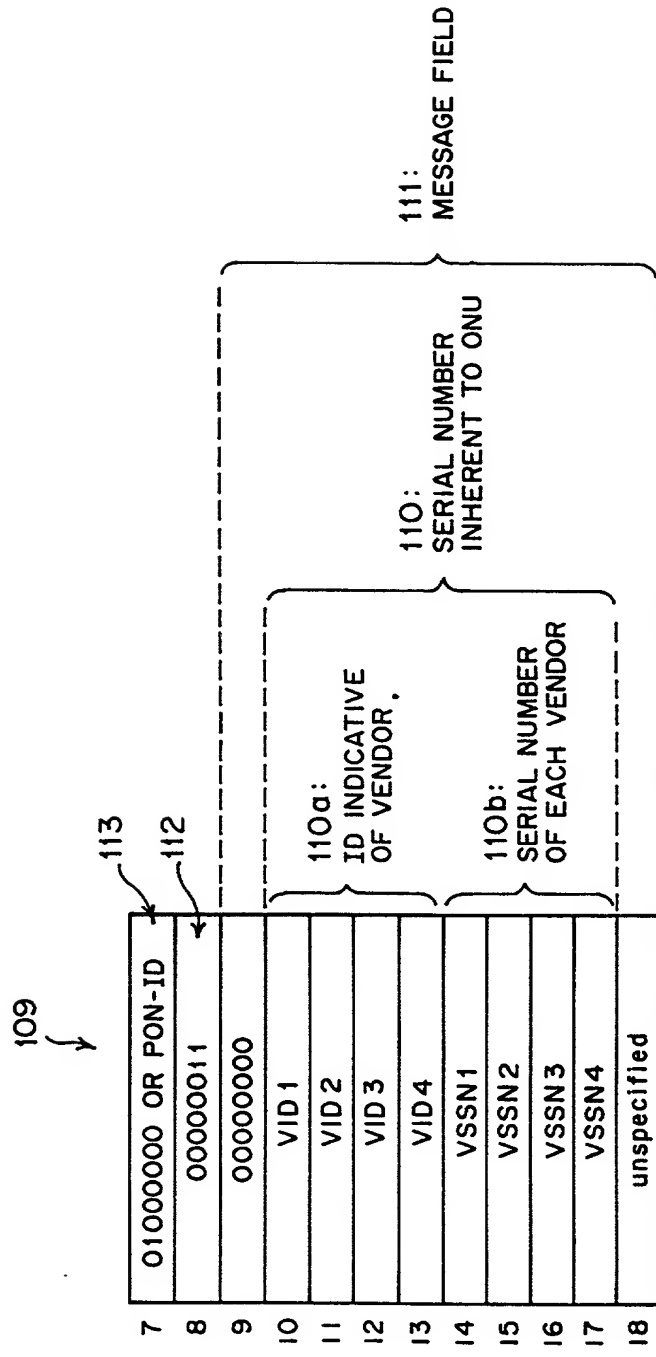
BYTE	CONTENTS	DETAIL	
7	xxxxxxx	INDIVIDUAL PON ID	113
8	01111zzz	MESSAGE ID OF VENDOR SPECIFIC MESSAGE (LOWER THREE BITS MAY BE ARBITRARILY UTILIZED)	112
9	yyyyyyyy	111: MESSAGE FIELD ALLOWED TO BE UTILIZED ARBITRARILY BY EACH VENDOR (TEN BYTES)	112
10	yyyyyyyy		
11	yyyyyyyy		
12	yyyyyyyy		
13	yyyyyyyy		
14	yyyyyyyy		
15	yyyyyyyy		
16	yyyyyyyy		
17	yyyyyyyy		
18	yyyyyyyy		

FIG.63



- ① BROADCAST TYPE : ALL ONUs ACCEPT MESSAGE
- ② ADDRESSED TO ONU#1 : ONLY ONU#1 ACCEPTS MESSAGE
- ③ ADDRESSED TO ONU#2 : ONLY ONU#2 ACCEPTS MESSAGE
- ④ ADDRESSED TO ONU#3 : ONLY ONU#3 ACCEPTS MESSAGE

FIG. 64



SERIAL NUMBER ONU MESSAGE FORMAT (UPSTREAM)